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SUSTAINING ASSOCIATES

As this is written, the 1960 Sustaining Associate renewals are coming into this office. An additional list will be printed later. Those renewals or new applications received prior to press time were as follows:

American Cyanamid Company
Agricultural Division
30 Rockefeller Plaza
New York 20, New York

Bioferm Corporation
Wasco, California

Colloidal Products Corporation
100 Gate 5 Road
Sausalito, California

Diamond Alkali Company
300 Union Commerce Building
Cleveland 14, Ohio

E. I. Du Pont de Nemours Company, Inc.
Industrial and Biochemicals
Wilmington 98, Delaware

Freeport Sulphur Company
16th Floor, Commerce Building
New Orleans, Louisiana

Geigy Agricultural Chemicals
Division of Geigy Chemical Corporation
Saw Mill River Road
Ardsley, New York

G. L. F. Soil Building Service
Division of Cooperative G. L. F. Exchange, Inc.
Ithaca, New York

Gulf Oil Corporation
Gulf Building
Pittsburgh 30, Pennsylvania

H. D. Hudson Manufacturing Company
589 East Illinois Street
Chicago 11, Illinois

Eli Lilly and Company
Agricultural Research Center
Greenfield, Indiana

McLaughlin Gormley King Company
1715 Fifth Street, S. E.
Minneapolis 14, Minnesota

Monsanto Chemical Company
800 North Lindbergh Boulevard
St. Louis 66, Missouri

S. B. Penick & Company
100 Church Street
New York 8, New York

Pennsylvania Farm Bureau Cooperative Association
3609 Derry Street
Harrisburg, Pennsylvania

Port Fertilizer & Chemical Company
P. O. Box 337
Los Fresnos, Texas

Rohm & Haas Company
222 W. Washington Square
Philadelphia 5, Pennsylvania

Shell Chemical Company
Agricultural Chemicals Division
110 West 51st Street
New York 20, New York

Spraying Systems Company
3201 Randolph Street
Bellwood, Illinois

Swift & Company
Agricultural Chemicals Division
Union Stock Yards
Chicago 9, Illinois

Velsicol Chemical Corporation
330 East Grand Avenue
Chicago 11, Illinois

Wisconsin Alumni Research Foundation
Insecticide Testing Laboratory
506 N. Walnut Street
Madison 5, Wisconsin

Woolfolk Chemical Works, Ltd.
Fort Valley, Georgia

AUTOGRAPHA O O

Atlantic City. Each June issue of the Bulletin contains the *Program Highlights* for the coming annual meeting. This year we meet at Atlantic City and the various committees have plans well under way. Please read *Program Highlights*, note the new deadline for titles and synopses (August 15), use the last page of this issue as per instructions, remind your company that an exhibit at Atlantic City would be desirable and prepare your prize pictures for the Photo Salon.

Organic Pesticides. The June 1957 Bulletin contained a most useful paper by E. E. Kenaga on organic insecticides and related materials. He has revised the paper, brought it up to date and it is again printed in this issue. The age of organic pesticides which dates from the discovery of DDT has produced these compounds in abundance and no listing can be completely current. Nevertheless, Mr. Kenaga has tried and we think he has done a fine job.

History. An historical paper in this issue by T. L. Bissell is of interest not only for the purpose written but also because many of the entomologists mentioned were or are important personages in the founding and fostering of this Society.

Society Headquarters. We have now spent three months in the Society's new home. We have many more visitors than we ever saw in the Washingson office. We invite you also. If you come out from Washington by D. C. Transit, take a bus marked 82—Hollywood; if by Greyhound (buy a ticket first) take a bus marked Baltimore or Plant Industry Station or Research Center. Leave the bus at the Calvert Road stop and walk two blocks east to 4603. If you are driving out from Washington, follow U. S. 1 to College Park and turn right off the highway onto Calvert Road and to 4603; or drive east on Independence Avenue across the East Capitol Street bridge, turn right and then left onto Kenilworth Avenue, continue on this out into Maryland and turn left on Calvert Road—the fourth traffic light. It is 1.1 miles to the office from that light. If you are coming from Baltimore follow U. S. 1 to College Park, past the University and then turn left on Calvert Road; or follow the Baltimore-Washington Parkway to the Glendale Road—College Park—Greenbelt interchange, leave the Parkway, go 1.1 miles west (toward U. S. 1) to the first traffic light, turn left onto Kenilworth Avenue, go 1.3 miles to the first traffic light in this direction and turn right 1.1 miles on Calvert Road to the office. If you are flying, we are between two large airports and limousine or taxi transportation is available at the Washington Airport (piston aircraft) or at the Baltimore Friendship Airport (jets). If you don't have time to stop call us at UNion 4-1334.

THE
1960 ATLANTIC CITY MEETING

Entomological Society of America

HOTEL CHALFONTE-HADDON HALL

ATLANTIC CITY, N. J.

November 28-December 1, 1960

Program Committee

Ralph W. Sherman, *Chairman*

Edward H. Smith

Dan O. Wolfenbarger

ATLANTIC CITY—*Rendezvous for Conventioneers*

ATLANTIC CITY is the eastern terminus of U. S. 30, of U. S. 40 and is reached from Interchange No. 40 of the Garden State Parkway. There is a parking lot adjoining Haddon Hall. Eastern Air Lines and Allegheny Air Lines serve the city. The Pennsylvania-Reading Seashore Railroad comes from Philadelphia. However you choose to travel, plan your trip to be present for four full days of meetings.

This city is often thought of as a beach resort only. Soothing sun, sand and salt water are high experiences of summer—but the entomologists meet after Thanksgiving. When we assemble on November 28, the Summit Conference will be forgotten, the 1960 elections will have been totaled and the frantic pleadings of office seekers stilled for a while. We invite our members to the 1960 Atlantic City meeting, we suggest that you look with biologists' eyes out across the cold gray Atlantic beneath a harvest moon, we propose that you hike the Boardwalk with your friends and debate entomological contributions to human welfare, and we hope for further light into the unknown.

The shibboleth of this century is science. Although unsure of denotation, pronunciation or number every cub reporter is certain that the word data must be often used and must always be modified by the word scientific. We trust our deliberations at the Chalfonte-Haddon Hall will be calm, objective and truly scientific.

Program Highlights

ADOPTING A THEME

Our overall theme for this year's National meetings is intended to convey the message that insects can be controlled without endangering human health. It seems particularly appropriate at this time to point out the many contributions that our profession has made to human welfare. Therefore, the theme selected for the meeting is—

Entomological Contributions to Human Welfare

Section Chairmen have been requested to schedule at least one paper apiece that carries out this theme. Each of these papers, it is anticipated, will show clearly how the work of those in the Section has contributed to the central theme. The manner in which many of the Section officers have already planned their programs to complement the theme is detailed under the Sectional features. Guest speakers at plenary sessions have been selected to cover various phases of the theme.

MEMORIAL LECTURE

The *Memorial Lecture Committee* has unanimously selected Dr. Anthony W. A. Brown to deliver the third memorial lecture. The 1960 lecture will honor John Henry Comstock (1849–1931) who founded the department of entomology at Cornell University in 1875. During the 40 years of his active professorship at his Alma Mater he built the department into one of the most eminent in its field.

Dr. Brown is professor and head of the Department of Zoology, University of Western Ontario, London, Ontario, Canada. He is also Biologist in the Division of Environmental Sanitation, World Health Organization. A recognized authority on insect biochemistry, especially nitrogenous metabolism, he is the author of numerous scientific publications, but is most widely known for his comprehensive textbook, "Insect Control by Chemicals" published in 1951, and the monograph, "Insecticide Resistance in Arthropods," published in 1958 by the World Health Organization as Publication No. 38 in their Monograph Series.

Dr. Brown received his B.S. degree from the University of Toronto in 1933, and was awarded M.A. and Ph.D. degrees by the same institution in 1935 and 1936, respectively.

INSTRUCTIONS FOR SUBMITTING TITLES AND DELIVERING PAPERS

The following directions adopted by the Society in 1958 and modified by the action of the Governing Board in 1959 should be followed in the submission of titles and the timing of papers:

1. **Deadline for Receipt of Titles.**
   The deadline has been moved forward to **August 15** and must be strictly observed if your paper is to be assigned a spot on the program. Please keep titles *brief* to avoid the necessity of abbreviating them in the printed program.
2. **Form for Submitting Titles.**
   An approved form for submitting titles is the tear sheet which is printed as the last page of this issue of the BULLETIN.
3. **Synopsis.**
   A block is provided on the Form for Submitting Titles in which to clearly *type or print*, in a manner suitable for the printer, a synopsis (*of 50 or fewer words*) of the methods and results of your paper.
4. **Timing.**
   Authors of submitted papers will be allotted a maximum of 10 minutes for paper reading with a 2 minute interval between papers for discussion. Section and Subsection Chairmen will adhere strictly to this timing.
5. **Scientific and Common Names.**
   The correctness of common and scientific names should be carefully verified in "Common Names of Insects Approved by the Entomological Society of America," appearing in the BULLETIN, Vol. 1, No. 4, Dec. 1955.
6. **Assignment of Papers.**
   The *Program Committee* has the responsibility for assigning papers to sections and subsections according to subject matter, with due consideration to author's preference.

SYMPOSIA

Sections arranging Symposia for their own sessions should so time their speakers that their talks will extend for multiples of 12 minutes, to coordinate with the time schedule for all concurrent sessions.

FEATURES OF THE PLENARY SESSIONS

Presidential Address
M. P. JONES, *U.S.D.A., Washington, D. C.*

C. V. Riley Memorial Lecture, Honoring J. H. Comstock.
A. W. A. BROWN, *The University of Western Ontario*

Guest Speakers
EDWARD F. KNIPLING, *U.S.D.A., Beltsville, Md.*
"What Medical and Veterinary Entomology Has Done to Conserve Human Life"
HARLOW B. MILLS, *Illinois Natural History Survey*
"Insects' Greatest Competitor"
LESTER G. MACNAMARA, *Chief, Bureau of Wildlife Management, N. J. Dept. of Conservation & Economic Development, Trenton*
"The Role of Chemicals in Wildlife Conservation"
REPORTS OF DELEGATES TO THE XITH INTERNATIONAL CONGRESS OF ENTOMOLOGY, *Vienna, August 17–25, 1960*
4-H CLUB ENTOMOLOGY DEMONSTRATION

FEATURES OF SECTION PROGRAMS

SECTION A—GENERAL ENTOMOLOGY

Symposium: Recent Advances in the Study of Fossil Insects
Moderator: RAY F. SMITH, *University of California, Berkeley*
Invited Speakers:
FRANK M. CARPENTER, *Harvard University, Cambridge, Mass.*
A. R. PALMER, *U. S. Geological Survey, Washington, D. C.*
MILTON W. SANDERSON, *Illinois Natural History Survey, Urbana*
PAUL HURD, *University of California (tentative)*

Symposium: Some Basic Aspects of Systematic Categories, Mainly Those Above Species Level
Moderator: CHARLES D. MICHENER, *Univ. of Kansas*
Invited Speakers:
D. KEITH MCE. KEVAN, *MacDonald College, Quebec*
R. I. SAILER, *U.S.D.A., Washington, D. C.*
GEORGE F. EDMUNDS, JR., *Univ. of Utah, Salt Lake City*
WILLIAM L. BROWN, *Harvard Univ. (tentative)*
PAUL R. EHRLICH, *Stanford Univ. (tentative)*
R. S. BIGELOW, *MacDonald College (tentative)*
Invited Speakers:
MELVILLE H. HATCH, *Univ. of Washington, Seattle*
"The Aesthetic Value of Entomology"
CURTIS W. SABROSKY, *U.S.D.A., Washington, D. C.*
"The New International Code of Zoological Nomenclature"

SPEAKER TO BE ANNOUNCED. "Some Highlights of the XIth International Congress of Entomology"

H. A. DENMARK, *Florida State Plant Board, Gainesville* "Recent Progress and Needs in the Documentation of our Insect Fauna"

SECTION A b—TEACHING

Symposium: The Organization and Teaching of Entomology

Invited Speakers:

A. GLENN RICHARDS, *Univ. of Minnesota, St. Paul* "The Place of Physiology in Entomological Curricula"

JOHN K. REED, *Clemson College, Clemson, S. C.* "Education vs. Training for Fntomology Students"

Plus three additional invited speakers to be announced.

SECTION B—INSECT PHYSIOLOGY & TOXICOLOGY

Joint Session with Biometric Society, East North American Region. Plans are under discussion for a jointly-sponsored session devoted to statistical aspects of entomology and entomological research methodology. Speakers would be chosen from biometricians who have worked with entomologists.

SECTION C—INSECT BIOLOGY

Joint Symposium—Sections C and D and Subsections C c and C d participating.

Biological Transmission of Disease Agents

Part I, Plant Disease Agents

Moderator: KARL MARAMOROSCH, *Rockefeller Institute, New York*

Speakers to be announced.

Part II, Agents of Human and Animal Diseases

Moderator: W. C. MCDUFFIE, *U.S.D.A., Beltsville, Md.*

Speakers listed under Section D.

Group of papers on Insect Genetics. Speakers to be announced. See separate announcement in this issue.

SECTION C a—BIOLOGICAL CONTROL

Invited Speaker: JAMES K. HOLLOWAY, *U.S.D.A., Albany, Calif.* "Biological Control of Weeds"

Discussion: It is planned to round out the session on Biological Control with a *discussion period* to permit examination of various topics already covered.

SECTION C b—APICULTURE

Symposia: Female Dimorphism and Colony Organization in Social Hymenoptera. Co-sponsored by the International Union for the Study of Social Insects and by the Bee Research Association

Eight or ten speakers to be announced. In two sessions.

SECTION C c—INSECT VECTORS OF PLANT DISEASES

Joint Symposium: Participation as described under Section C

SECTION C d—ECOLOGY AND BIONOMICS

Joint Symposium: Participation as described under Section C

Invited Speaker: LAMONT C. COLE, *Cornell Univ., Ithaca, N. Y. (tentative)*

SECTION D—MEDICAL AND VETERINARY ENTOMOLOGY

Joint Symposium: Sections C and D and Subsections C c and C d participating.

Biological Transmission of Disease Agents

Part I, Plant Disease Agents

Moderator: KARL MARAMOROSCH, *Rockefeller Institute, New York*

Speakers to be announced.

Part II, Agents of Human and Animal Diseases

Moderator: W. C. MCDUFFIE, *U.S.D.A., Beltsville, Md.*

Invited Speakers:

C. B. PHILIP, *Rocky Mountain Laboratory, Hamilton, Mont.*

ROBERT TRAUB, *U. S. Army Medical Research and Development Command, Washington, D. C.*

D. BLASCOVIC, *Institute of Virology, Bratislava, Czechoslovakia ((tentative)*

GEORGE W. HUNTER III, *Department of Microbiology, Univ. of Florida*

WILLIAM C. REEVES, *Univ. of California*

HERBERT C. BARNETT, *Walter Reed Army Institute of Research*

DARIEL E. HOWELL, *Oklahoma State Univ.*

Panel Discussion: The Biology and Control of the Face Fly, *Musca autumnalis* De Geer

Moderator: E. C. TURNER, JR., *Virginia Agricultural Experiment Station*

Speakers from Northeast, Mid-West, and Canada to be announced. All who are working with this species are urged to attend and participate in the discussion.

Invited Speaker: K. D. QUARTERMAN, *Communicable Disease Center, U.S.P.H.S., Savannah, Ga.* "Highlights in Medical and Veterinary Entomology During 1960"

SECTION E—CONTROL, EXTENSION AND REGULATORY ENTOMOLOGY

Panel Discussion: The Entomological Contributions to Human Welfare by Extension, Plant Pest Control, Plant Quarantine, and Public Health

Invited speakers to be announced. A fifth invited speaker will cover the same areas from a State viewpoint.

SECTION E a—EXTENSION

Symposium I: Evaluating Past and Present Extension Programs to Plan for the Future

Moderator: LLOYD E. ADAMS, *Pa. State Univ., University Park*

Invited Speakers:

RAY R. KRINER, *Greencastle, Pa..*

J. O. PEPPER, *Pa. State Univ., University Park*

GEORGE D. JONES, *N. C. State College, Raleigh (tentative)*

J. O. ROWELL, *V.P.I., Blacksburg, Va.*

N. C. NETTLES, *Clemson Agricultural College, Clemson, S. C.*

H. B. PETTY, *Univ. of Illinois, Urbana (tentative)*

A. A. MUKA, *Cornell Univ., Ithaca, N. Y.*

Symposium II: Recognizing Extension Problems and Searching for Solutions

Moderator: PAUL H. WOOLEY, *Cornell Univ., Ithaca, N. Y.*

Invited Speakers:

E. J. HANSENS, *Rutgers Univ., New Brunswick, N. J.*

JOHN NAEGELE, *Cornell Univ., Ithaca, N. Y.*

G. B. MACCOLLUM, *Univ. of Vermont, Burlington*

JOHN L. LIBBY, *Rutgers Univ., New Brunswick, N. J.*

HENRY MENUSAN, JR., *Pa. State Univ., University Park*

ALFRED C. DOWDY, *Michigan State Univ., East Lansing*

4-H CLUB ENTOMOLOGY DEMONSTRATION *(tentative)*

SECTION E b—PLANT PEST CONTROL AND QUARANTINE

Panel Discussions:

Contributions of Pest Control Programs to the Agricultural Economy

The Need for a Strong Plant Quarantine Program and Pest Detection Follow-up

What Insect Pests or Plant Diseases are to be Considered for Eradication or Control Programs

Essentials Necessary for a Control Program to be Considered Successful

Bee Regulations (tentative)

Invited speakers to be announced.

SECTION F—CHEMICAL CONTROL INVESTIGATIONS

Symposium: Insecticides Contribute to Human Welfare

Moderator: GEORGE C. DECKER, *Illinois Natural History Survey*

Invited Speakers to be announced.

PHOTO SALON

Photo Salons on insects and related arthropods were held at our Salt Lake City meeting in 1958 and again at Detroit in 1959. Plans for the third Salon to be held at Atlantic City are well under way. Please see the note regarding categories featuring insect identification and classification on the inside back cover of the March 1960 BULLETIN.

Society members are especially urged to enter the competition in the above categories. Their entries as well as those of nature photographers everywhere are invited for all categories of the Salon.

Photo Salon Committee,

J. ALFRED ADAMS
J. R. HOFFMAN
J. O. PEPPER
R. L. POLIS
RAY R. KRINER, *Chairman*

EXHIBITS AT ATLANTIC CITY

Exhibits for the Atlantic City meeting (November 28 through December 1, 1960) are currently being solicited.

The exhibit area, Stair Hall and the English Lounge on the Lounge Floor of the Haddon Hall Hotel, is an excellent location. Registration will take place in Stair Hall and members attending meetings in the Vernon Room and Garden Room will pass through the English Lounge exhibit area. All necessary physical facilities are available.

Individuals or organizations interested in presenting exhibits can obtain details from the appropriate member of the Exhibits Committee. The members of the Committee and their areas of responsibility are as follows:

Educational Exhibits—D. R. SHEPHERD, USDA
Agricultural Research Service
Plant Pest Control Division
Washington 25, D. C.
A. A. MUKA
Department of Entomology & Limnology
Cornell University
Ithaca, New York

4-H Exhibits—L. E. ADAMS
Department of Zoology & Entomology
Pennsylvania State University
University Park, Pennsylvania
H. E. SCOTT
Department of Entomology
University of North Carolina
Raleigh, North Carolina

Publishers Exhibits—ARNOLD MALLIS
Gulf Research & Development Company
P. O. Drawer 2038
Pittsburgh, Pennsylvania

Commercial Exhibits—E. N. WOODBURY
Hercules Powder Company
Agricultural Chemicals Laboratory
Wilmington, Delaware

SPECIAL COMMITTEES

A previous list of Special Committees for 1960 was printed on pages 46 and 47 of the March 1960 BULLETIN. President Jones has selected the following committees since that time.

COMMITTEE ON PROMOTION OF ESTABLISHMENT OF STANDARD TEST METHODS

A. W. Lindquist—Beltsville, Maryland
G. F. Ludvik—St. Louis, Missouri
K. D. Quarterman—Savannah, Georgia
H. T. Reynolds, *Chairman*—Riverside, California

GOVERNING BOARD COMMITTEE ON PUBLICATIONS

L. D. Newsom—Baton Rouge, Louisiana
C. B. Philip—Hamilton, Montana
E. G. Linsley, *Chairman*—Berkeley, California

PUBLIC RELATIONS COMMITTEE

M. R. Budd—Wilmington, Delaware
Harold Gunderson—Ames, Iowa
B. B. Pepper—New Brunswick, New Jersey
R. G. Richmond—Washington, D. C.
D. G. Hall, *Chairman*—Washington, D. C

COMMITTEE ON JOINT MEETINGS

L. S. Jones—Riverside, California
J. A. Slater—Storrs, Connecticut
J. McD. Grayson, *Chairman*—Blacksburg, Virginia

HISTORY OF PEST CONTROL

A history of pest control has been prepared by J. J. Davis, the purpose being to preserve the early history of the industry for future generations. The cost of publication of over 200 pages and 35 or more illustrations will be about $700.00. The original manuscript and supporting material will be deposited in the Purdue Entomology Library, but it would be helpful if the material could be published and available to all. Mr. Davis advises that it can be published if 250 subscribe for it at $3.00 a copy, but advance orders are essential to cover most of the cost of printing and mailing. Payment is not to be made until the book is received. If you are interested in the publication of this history, advise J. J. Davis, Department of Entomology, Agricultural Hall, Purdue University, Lafayette, Indiana.

NORTH-CENTRAL BRANCH

The North-Central Branch met in Milwaukee, Wisconsin, March 23–25, 1960.

Symposia on chemical residues and on pesticide-wildlife problems were among the highlights of the meeting.

Officers elected were:

Chairman, D. M. DeLong—Columbus, Ohio
Chairman-Elect, L. K. Cutkomp—St. Paul, Minnesota
Secretary-Treasurer, G. E. Guyer
East Lansing, Michigan
Representative on the Governing Board, R. H. Davidson
Columbus, Ohio

The *Proceedings of the North-Central Branch* appears annually. Volume 15, which reports the papers presented at the above meeting, will be ready for distribution about August 1, 1960. Copies may be obtained at $3.00 each from Gordon E. Guyer, Secretary-Treasurer, North-Central Branch, Department of Entomology, Michigan State University, East Lansing, Michigan. He will also furnish quotations on previous volumes on request.

Commercial and Experimental Organic Insecticides

(1960 REVISION)

Indexed as to Their Scientific, Common and Trade Names, Code Designations, Uses and Manufacturers

By EUGENE E. KENAGA

The Dow Chemical Company, Midland, Michigan

ENTOMOLOGISTS AND OTHERS CONCERNED WITH INSECTICIDES and their uses are constantly confronted with the problem of keeping abreast of current and past developments on the subject of the chemical control of insects, other arthropods and similar pest animals. It is as important to identify the "species" of insecticides as it is the species of insect when attempting to control an insect pest.

In view of the great number of commercial and experimental compounds which are being tested now and which have been used during the last decade, it is becoming increasingly difficult to recognize the relationships of the various chemicals which may be coded in several manners and given various synonymous chemical or trade names. The history of the development of an insecticide or similar material as recorded in the literature often begins with a coded number, an abbreviated chemical name or some other incomplete designation. Later, other more appropriate identifications are given, often without reference to the previous codings or names.

This report assembles most of the known nomenclature and coding concerning the published organic commercial and experimental "insecticides." The term "insecticides" in this paper is meant to include insecticides, acaricides, insect repellents and attractants, nematocides, fumigants and insecticide activators.

The method and basis of compiling this information on commercial and experimental organic insecticides are as follows. All known insecticide manufacturers in the United States and some in Europe selling products in the United States were contacted and asked to supply information concerning their respective products. Only *manufacturers* of organic insecticidal *chemicals* per se are listed in this compilation. Companies who do not manufacturer insecticidal chemicals but merely formulate and/or package insecticidal compositions are omitted. The insecticides included here are commercial or experimental materials. In order to be classified as experimental they must be "field tested." The results of these tests should be published in order for the insecticide to be included in this tabulation. The tabulation does not include long lists of analogues and homologues tested on a few organisms.

Tabulating Categories

Manufacturers having insecticides which meet the above conditions were asked to submit certain information concerning their products, which was then tabulated under convenient chemical or insecticidal groups as follows.

Code Letter	*Name of Group*
A	Activators or synergists for insecticides
B	Botanicals and derivatives
C	Chlorinated aryl hydrocarbons (containing 6 or more chlorines)
D	DDT relatives (diphenyl aliphatics)
F	Fumigants
H	Heterocyclic compounds (those not found elsewhere)
M	Miscellaneous compounds
N	Nitrophenols and derivatives
P	Phosphorus-containing compounds 1. Heterocyclic derivatives 2. Aryl derivatives 3. Aliphatic derivatives
Q	Attractants
R	Repellents
S	Sulfonates, sulfides, sulfones, sulfonamides, sulfites
T	Thiocyanates
X	Carbamates

Chemical Names Used

The chemical names of the compounds in each of the foregoing groups as tabulated are arranged in the following order.

1. Name company prefers to use in publication at present.
2. Name used which is in accordance with the principles of *Chemical Abstracts* nomenclature.
3. Alternative company designation used in past but not used now (if found in publication). This does not necessarily include changes like reversed word order, parentheses, dropping of numbers and letters indicating positions of substituents, etc.

A chemical name occupying two lines separated by an equal (=) sign is joined together without the equal sign if written on one line. This situation occurs in this paper where the name is broken to form a new line because of space limitations.

The numbers 1, 2 or 3 are used as defined above in this paper to designate the authority of the chemical names.

Manufacture of Chemical and Chemical Availability

1. All manufacturing companies are listed in alphabetical order. Companies no longer making certain insecticides are differentiated from those presently making these same insecticides. Each company was asked to classify the availability of the compounds which it now makes or has made in the past as follows:
   a. Not available
   b. Available in research quantities
   c. Limited commercial quantities
   d. Commercial quantities

   The letters a, b, c and d in parentheses which follow the manufacturers' name in the table indicate the availability status of the chemical.
2. With DDT and benzene hexachloride and some other common insecticides and fumigants, it is necessary to restrict the list to manufacturers *presently* making the compound.

Type of Insecticidal Activity

1. The manufacturer has indicated the use for which the insecticide was intended as it fits the following categories:
   Acaricide (Acar.)
   Attractant (Att.)
   Commodity or space fumigant (C. fum.)
   Insecticide (Ins.)
   Insecticide activator (synergist) (Syn.)
   Mothproofer (MP)
   Nematocide (Nem.)
   Repellent (RP)
   Soil fumigant (insecticide) (S. fum.)
   Systemic insecticide for animals (Sys. a.)
   Systemic insecticide for plants (Sys.)
   Abbreviations shown in parentheses above are those used in the table to indicate the type of insecticidal activity.

Other Designations

1. "Other designations" includes common names, letter and number designations, trade names, trademarks, etc., used by the company(ies) introducing an insecticide to experimental or commercial use. All trademarks and other names which are proprietary in the United States are capitalized. Letter marks, however, may be abbreviations of chemical names and are not necessarily proprietary. No attempt whatsoever has been made to match any of these names line for line with the manufacturer in the compilation. Names and letters which are in italics are those required for use in all publications of the Entomological Society of America. (C. N. Smith, JOURNAL OF ECONOMIC ENTOMOLOGY 52(2):361–2; 52(5):1032; 52(6):1037; 1959.)

Indexing Procedures

Insecticide information classified according to the following groupings is found on pages 55 to 72. On some occasions only the common name or trade name, code letter or number or manufacturer is known or available to a person looking for further data on an insecticide. Indexes to all of these items are useful to refer back to the table where the chemical name and other more complete information on the item in question is summarized. The indexes are organized as follows:

1. **Common and Manufacturers' Names Index** (see pages 73 to 74)
   This index includes the nonscientific common names, trade names and names previously defined in "other designations." These names are listed in alphabetical order.
2. **Number Index** (see pages 75 to 76)
   Many compounds are or have been designated by numbers. The materials have been listed here (regardless of their prefixes or suffixes) in numerical order.
3. **Letter Index** (see pages 76 to 77)
   Many compounds are or have been designated by letters. The materials have been listed here (regardless of prefixes or suffixes) in alphabetical order.
4. **Insecticide Use Index** (see pages 77 to 78)
   The uses of the various "insecticides" are indexed under the following categories: acaricides, commodity fumigants, insecticides, insecticide activators (synergists), insect attractants, insect repellents, mothproofers, nematocides, soil fumigants, systemic insecticides for animals and systemic insecticides for plants.
5. **Insecticide Manufacturers' Index** (see pages 78 to 79)
   The insecticide manufacturing companies are listed in alphabetical order, both in the compilation and the index. The products of each manufacturer are listed alphabetically according to the chemical name code letter used in the table. Companies which have merged are indicated by reference to the name of the company now being used.

In compiling this report, considerable time was spent in checking the completeness and accuracy of the data appearing in the text, table and indexes. In a report of this scope, however, it is impossible to guarantee perfection. Thus, neither the Entomological Society of America, Eugene E. Kenaga, nor The Dow Chemical Company can take responsibility for errors in the data.

Code	Auth.	Chemical Name	Manufacturer of Chemical and Availability	Chemical Use	Other Designations for Chemical and its Compositions
		Activators or Synergists for Insecticides			
A-1	1, 2	α-[2-(2-butoxyethoxy) =[a] ethoxy]-4,5-methylenedioxy-2-propyltoluene	Fairfield (d) U.S. Industrial (a)	Ins. Syn.	*piperonyl butoxide*
	3	butylcarbitol-6-propyl = piperonyl ether			
A-2	1, 2	mixture of 3-alkyl-6-carb = ethoxy-5-(3,4-methylene = dioxyphenyl)-2-cyclohexen-1-one and 3-alkyl-5-(3,4-methylenedioxyphenyl)-2-cyclohexen-1-one	Fairfield (a) U.S. Industrial (a)	Syn.	*piperonyl cyclonene* piperonyl cyclohexenone
A-3	1	di-*n*-propyl-3-methyl-6,7-methylenedioxy-1,2,3,4-tetrahydronaphthalene-1,2-dicarboxylate	Penick (d)	Syn.	*propyl isome* n-propyl isome
	2	dipropyl 5,6,7,8-tetra = hydro-7-methylnaphtho = [2,3]-1,3-dioxole-5,6-di = carboxylate			
	3	di-*n*-propyl maleate iso = safrole condensate			
A-4	1	2,6-bis(3,4-methylenedioxy = phenyl)-3,7-dioxabicyclo = [3.3.0]octane	Norda (b) Shulton (a)	Syn.	*sesamin*
	2	sesamin			
A-5	1	2-(3,4-methylenedioxy = phenyl)-6-(3,4-methylene = dioxyphenoxy)-3,7-dioxa = bicyclo[3.3.0] octane	Norda (b) Shulton (a)	Syn.	*sesamolin*
	2	sesamolin			
A-6	1	2-(3,4-methylenedioxy = phenoxy)-3,6,9-trioxa = undecane	Shulton (b) USDA (a)	Syn.	*sesamex* Sesoxane ENT 20871
	2	acetaldehyde 2-(2-ethoxy = ethoxy)ethyl 3,4-methylene = dioxyphenyl acetal			
A-7	1, 2	1,2-methylenedioxy-4-[2-(octylsulfinyl)propyl] = benzene	Penick (d)	Syn.	*sulfoxide* Sulfox-Cide
	3	*n*-octyl sulfoxide of isosafrole			
A-8	1,2	N-(2-ethylhexyl)-bicyclo = [2.2.1]-hept-5-ene-2,3-dicarboximide	MGK (d)	Syn.	MGK 264 Octacide 264 Van Dyke 264
	3	*N*-octyl bicycloheptene = dicarboximide			
	3	*N*-2-ethylhexyl imide of endomethylene tetrahydro = phthalic acid			
A-9	1, 2	*N*-isobutylhendecenamide	DuPont (a)	Syn.	IN-930
	3	*N*-isobutylundecyleneamide			
A-10	1, 2	2-isovaleryl-1,3-indandione	Inland Chem (d) Kilgore (a) Motomco (a)	Ins. Syn.	Valone
A-11	1	pivalyl indandione	Inland Chem (d)	Ins.	pindone
	2	2-pivaloyl-1,3-indandione	Motomco (a)	Syn.	Pivalyl Valone
	3	2-pivaloylindane-1,3-dione	Kilgore (a)		

[a] A chemical name occupying two lines separated by an equal (=) sign is joined together without the equal sign if written on one line. This situation occurs in this paper where the name is broken to form a new line because of space limitations.

Code	Auth.	Chemical Name	Manufacturer of Chemical and Availability	Chemical Use	Other Designations for Chemical and its Compositions
		Botanicals and Derivatives			
B-1	1, 2	rotenone (from plant species *Derris* and *Lonchocarpus*)	Fairfield (d) Penick (d)	Ins.	rotenone derris
B-2	1, 2	seeds of *Schoenocaulon officinale* (veratrine alkaloids)	Olin-Math. (a)	Ins.	sabadilla
B-3	1, 2	ground *Ryania specioca* stem-wood (alkaloid ryanodine) $C_{25}H_{35}O_9N$ or $C_{26}H_{37}O_9N$	Merck (a) Penick (d)	Ins.	ryania
B-4	1, 2	pyrethrum (principally from plant species *Chrysanthemum cinariaefolium*)	Fairfield (d) MGK (d) Penick (d)	Ins.	pyrethrum pyrethrin I pyrethrin II
B-5	1	*dl*-2-allyl-4-hydroxy-3-methyl-2-cyclopenten-1-one esters of *cis* and *trans dl*-chrysanthemummonocarboxylic acids	Benzol Prod. (d) Fairfield (d) MGK (d) USDA (a)	Ins.	*allethrin* allyl homologue of cinerin I ENT 17510 synthetic pyrethrins
	2	allethrin			
	3	3-allyl-2-methyl-4-oxo-2-cyclo=penten-1-yl chrysanthemumate			
B-6	1, 2	*dl*-2-(2-cyclopentenyl)-4-hydroxy-3-methyl-2-cyclo=penten-1-one esters of *cis* and *trans dl*-chrysanthemum=monocarboxylic acids	Union Carbide (b)	Ins.	*cyclethrin*
	3	3-(2-cyclopenten-1-yl)-2-methyl-4-oxo-2-cyclopenten-1-yl chry=santhemumate			
	3	3-(2-cyclopentenyl)-2-methyl-4-oxo-2-cyclopentenyl chrysanthemum carboxylate			
B-7	1	3-furfuryl-2-methyl 4-oxo-2-cyclopenten-1-yl chrysanthemumate	USDA (?)	Ins.	*furethrin*
	2	furethrin			
B-8	1	6-chloropiperonyl chrysanthemumate	Benzol Prod (c) Fairfield (a) MGK (b) USDA (a)	Ins.	*barthrin* ENT 21557
	2	barthrin			
	3	6-chloropiperonyl ester of *dl-cis trans* chrysanthemum mono=carboxylic acid			
		Chlorinated Aryl Hydrocarbons (containing 6 or more Chlorines)			
C-1	1 2	benzene hexachloride 1,2,3,4,5,6-hexachloro=cyclohexane, mixed isomers	Columbia-Southern (d) Diamond Alkali (d) Frontier (d) General Chem. (d) Hooker (d) Olin-Math (d) Penn Salt (d) Stauffer (d)	Ins.	*BHC* HCH 666 gammexane
C-2	1	1,2,3,4,5,6-hexachloro=cyclohexane, 99% or more gamma isomer	Diamond Alkali (d) Hooker (d)	Ins.	*lindane* gamma BHC
	2	lindane			
C-3	1	1,2,4,5,6,7,8,8-octachloro-3a,4,7,7a-tetrahydro-4,7-methanoindane	Hyman (a) Velsicol (d)	Ins.	*chlordane* Octa-Klor Octachlor Velsicol 1068 1068
	2	chlordan			
	3	1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-4,7-methanoindene			
	3	1,2,3,4,5,6,7,10,10-octachloro-4,7,8,9-tetrahydro-4,7-*endo*=methyleneindane			

Code	Auth.	Chemical Name	Manufacturer of Chemical and Availability	Chemical Use	Other Designations for Chemical and its Compositions
C-4	1	1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-4,7-methanoindene	Velsicol (d)	Ins.	*heptachlor* Velsicol 104 E-3314
	2	heptachlor			
	3	1(3a),4,5,6,7,8,8-heptachloro 3a(1),4,7,7a-tetrahydro-4,7-methanoindene			
	3	1,4,5,6,7,10,10-heptachloro 4,7,8,9-tetrahydro-4:7 *endo*methyleneindene			
	3	4,5,6,7,9,10,10-heptachloro 4,7,8,9 tetrahydro-4,7-methanoindene			
C-5	1	chlorinated camphene containing 67–69% chlorine	Hercules (d)	Ins.	*toxaphene* 3956
	2	toxaphene			
C-6	1, 2	terpene polychlorinates (65% chlorine)	Goodrich (a) Heyden (d)	Ins.	Strobane compound 3961 Strobane AC-14
	3	chlorination product of terpene hydrocarbons			
C-7	1	not less than 95% of 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-1,4-*endo-exo*-5,8-dimethano = naphthalene	Hyman (a) Shell (d)	Ins.	*aldrin* compound 118 Octalene HHDN
	2	aldrin			
C-8	1	1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-1,4-*endo-endo*-5,8-dimethano = naphthalene	Hyman (a) Shell (a)	Ins.	*isodrin* compound 711
	2	isodrin			
C-9	1	not less than 85% of 1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-*endo-exo*-5,8-dimethanonaphthalene	Hyman (a) Shell (d)	Ins.	*dieldrin* compound 497 Octalox HEOD
	2	dieldrin			
C-10	1	1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4,-*endo-endo*-5,8-dimethanonaphthalene	Hyman (a) Shell (d) Velsicol (d)	Ins.	*endrin* compound 269
	2	endrin			
C-11	1, 2	decachlorooctahydro-1,3,4-metheno-2H-cyclobuta [cd] pentalen-2-one	Gen. Chem (d)	Ins. Acar.	1189 Kepone
	3	decachlorotetracyclo decanone			
	3	1,2,3,5,6,7,8,9,10,10-decachloro = tetracyclo $(5.2.1.0^{2,6}.0^{3,9}.0^{5,8})$-decane-4-one			
	3	decachlorotetrahydro-4,7-methanoindeneone			
	3	2,3,3a,4,5,6,7,7a,8,8a-decachloro-3a,4,7,7a-tetra = hydro-4,7-methanoinden-1-one			
C-12	1, 2	5,6,7,8,9,9-hexachloro-1-4,2-3-diepoxy-1,2,3,4-4a,5,8,8a-octahydro-5,8-methanonaphthalene	Shell (a)	Ins.	52-RL-71
C-13	1, 2	5,6,7,8,9,9-hexachloro-1,4-epoxy-1,4,4a,5,8,8a-hexahydro-5,8-methano = naphthalene	Shell (a)	Ins.	52-RL-45

Code	Auth.	Chemical Name	Manufacturer of Chemical and Availability	Chemical Use	Other Designations for Chemical and its Compositions
C-14	1, 2	6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-6,9-methano-2,4,3-benzo = dioxathiepin 3-oxide	Niagara (d)	Acar. Ins.	Thiodan BIO-5462 Hoe 2671 Malix
C-15	1, 2	1,3,4,5,6,7,8,8 octachloro 3a,4,7,7a-tetrahydro-4,7-methanophthalan	Shell (?)	Ins.	SD4402
		DDT Relatives			
D-1	1 2	dichloro diphenyl trichloro = ethane 1,1,1-trichloro-2,2-bis = (*p*-chlorophenyl)ethane	Diamond Alkali (d) Geigy (d) General Chem. (d) Lebanon (d) Montrose (d) Olin-Math. (d) Penn Salt (d) Stauffer (d)	Ins. MP	*DDT* Chlorophenothene
D-2	1 2 3	dichlorodiphenyl dichloro = ethane 1,1-dichloro-2,2-bis = (*p*-chlorophenyl)ethane tetrachlorodiphenylethane	General Chem. (d) Rohm and Haas (d)	Ins.	*TDE* DDD Rhothane
D-3	1, 2	1,1,1-trichloro-2,2-bis = (ethylphenyl)ethane	Rohm and Haas (a)	Ins.	Q-128
D-4	1, 2 3	1,1,1-trichloro-2,2-bis = (*p*-methoxyphenyl)ethane dianisyl trichloroethane	DuPont (d) Geigy (d)	Ins.	*methoxychlor* Methoxy DDT DMDT Marlate
D-5	1 2	2-nitro 1,1-bis(*p*-chloro = phenyl)propane and butane mixture (1-2 ratio) 1,1-bis(*p*-chlorophenyl)-2-nitropropane and butane mixture	Comm. Solv. (c)	Ins.	Dilan CS708
D-6	1 2	2-nitro-1,1-bis(*p*-chloro = phenyl)propane 1,1-bis(*p*-chlorophenyl)-2-nitropropane	Comm. Solv. (a)	Ins.	Prolan CS645A
D-7	1 2	2-nitro-1,1-bis(*p*-chloro = phenyl)butane 1,1-bis(*p*-chlorophenyl)-2-nitrobutane	Comm. Solv. (a)	Ins.	Bulan CS674A
D-8	1, 2	1,1,1-trichloro-2,2-bis = (*p*-tolyl)ethane	Geigy (a)	Ins.	DTT
D-9	1, 2 3	1,1-dichloro-2,2-bis(*p*-ethyl = phenyl)ethane 2,2-dichloro 1,1-bis(ethyl = phenyl)ethane	Rohm and Haas (d)	Ins. MP	Perthane Q-137
D-10	1, 2	1-(*p*-chlorophenyl)-2-nitro-1-(*p*-tolyl)propane	Comm. Solv. (a)	Ins.	CS728
D-11	1, 2	1-(*p*-chlorophenyl)-2-nitro-1-phenylbutane	Comm. Solv. (a)	Ins.	CS589
D-12	1 2	4,4′-dichlorobenzohydryl chloride chlorobis(*p*-chlorophenyl) = methane	Rohm and Haas (a)	Ins. Syn.	MS-60
D-13	1-2	1,1-bis(*x*(mostly *p*)chloro = phenyl)ethane	Dow (a)	Acar.	K-3,926

Code	Auth.	Chemical Name	Manufacturer of Chemical and Availability	Chemical Use	Other Designations for Chemical and its Compositions
D-14	1	1,1-bis(*p*-chlorophenyl) = ethanol	Sherwin-Williams (d)	Acar.	Dimite DMC DCPC
	2	4,4′-dichloro-*a*-methyl = benzhydrol			
	3	1,1-bis(*p*-chlorophenyl) = methylcarbinol			
D-15	1, 2	ethyl 4,4′-dichlorobenzilate	Geigy (d)	Acar.	Chlorobenzilate Geigy 338 G23992
D-16	1	1,1-bis(*p*-chlorophenyl) 2,2,2-trichloroethanol	Rohm and Haas (d)	Acar.	Kelthane FW-293
	2	4,4′-dichloro-*a*-(tri = chloromethyl)benzhydrol			
	3	1,1,1-trichloro-2-hydroxy-2,2-bis(*p*-chlorophenyl) = ethane			
D-17	1	1,1-bis(*p*-chlorophenyl)-2,2-dichloroethanol	Rohm and Haas (a)	Acar.	FW-152
	2	4,4′-dichloro-*a*-(dichloro = methyl)benzhydrol			
	3	1,1-dichloro-2-hydroxy-2,2-bis(*p*-chlorophenyl) = ethane			
D-18	1	ethoxymethylbis(*p*-chloro = phenyl)carbinol	Geigy (a)	Acar.	Etoxinol Geigy 337 G23645
	2	4,4′-dichloro-*a*-(ethoxy = methyl)benzhydrol			
D-19	1	1,1-bis(*p*-chlorophenyl)-2-propyn-1-ol	General Chem. (a) Rohm and Haas (a)	Acar.	876 Mr-30
	2	4,4′-dichloro-*a*-ethynyl = benzhydrol			
	3	4,4′-dichloro diphenyl = ethinyl carbinol			
	3	bis(*p*-chlorophenyl)ethynyl = carbinol			
		Fumigants			
F-1	1, 2 3	carbon tetrachloride tetrachloromethane	Diamond Alkali (d) Dow (d) Frontier (d) Solvay (d) Stauffer (d) Westvaco (d)	C. fum	CCl_4
F-2	1 2 3	ethylene dichloride 1,2-dichloroethane ethylene chloride	Diamond Alkali (d) Dow (d) Olin-Math. (d)	C. fum	EDC
F-3	1 2	propylene dichloride 1,2-dichloropropane	Dow (d) Union Carbide (d)	C. fum	
F-4	1, 2 3	1,1-1-trichloroethane methyl chloroform	Dow (d)	C. fum	Chlorothene
F-5	1, 2	trichloroethylene	Diamond Alkali (d) Dow (d) Hooker (d) Stauffer (d)	C. fum	
F-6	1 2 3	tetrachloroethylene tetrachloroethene perchlorethylene	Diamond Alkali (d) Dow (d)	C. fum	
F-7	1, 2	1,3-dichloropropene and 1,2-dichloropropane mixture	Dow (d) Shell (d)	Nem. S. fum.	D-D mixture Dowfume N
F-8	1, 2	dichloropropenes mixture	Dow (d)	Nem. S. fum.	Telone

Code	Auth.	Chemical Name	Manufacturer of Chemical and Availability	Chemical Use	Other Designations for Chemical and its Compositions
F-9	1, 2	hexachloropropene	Dow (b)	C. fum.	
F-10	1, 2	trichloroacetonitrile	I.G.Farben ? (?)	C. fum.	Tritox
F-11	1	β,β'-dichlorodiethyl ether	Dow (d)	C. fum	*dichloroethyl ether*
	2	bis(2-chloroethyl) ether	Olin-Math. (d)		Chlorex
	3	1-chloro-2(β-chloroethoxy) = ethane			
	3	sym. dichlorodiethyl ether			
F-12	1, 2	*p*-dichlorobenzene	Dow (d) Hooker (d) Monsanto (d) Solvay (d)	C. fum MP	Paracide Paradow Santochlor PDB
F-13	1, 2	*o*-dichlorobenzene	Dow (d) Hooker (d) Monsanto (d) Montrose (d) Solvay (d)	C. fum.	ODB
F-14	1, 2	chloropicrin	Dow (d)	C. fum.	Larvacide
	3	chlorpicrin	Morton (d)	S. fum.	Picfume
	3	nitrochloroform			
	3	trichloronitromethane			
F-15	1, 2	1,1-dichloro-1-nitroethane	Comm. Solv. (c)	C. fum.	Ethide
F-16	1, 2	3,4-dichlorotetrahydrothio = phene-1-dioxide	Diamond Alkali (b)	Nem. S. fum.	PRD
F-17	1, 2	1,2-dibromo-3-chloropropane	Amer. Potash (d) Dow (d) Shell (d)	S. fum.	Nemfume Nemagon OS 1897
F-18	1	ethylene chlorobromide	Dow (c)	Nem.	
	2	1-bromo-2-chloroethane	Westvaco (d)	S. fum.	
F-19	1	methyl bromide	Amer. Potash (d)	C. fum	Bromotox
	2	bromomethane	Dow (d) Great Lakes (d) Kolker (d) Mich. Chem. (d)	S. fum.	CH_3Br MeBr
F-20	1	ethylene dibromide	Amer. Potash (d)	C. fum.	Bromofume
	2	1,2-dibromoethane	Dow (d)	Nem.	EDB
	3	ethylene bromide	Great Lakes (d) Mich. Chem (d) Westvaco (d)	S. fum.	
F-21	1, 2	sulfuryl fluoride	Dow (c)	C. fum.	Vikane
F-22	1, 2	isopropyl formate	Dow (a)	C. fum.	
F-23	1, 2	ethyl formate	Comm. Solv. (d)	C. fum.	
F-24	1, 2	ethylene oxide	Dow (d)	C. fum.	ETO
	3	1,2-epoxyethane	Olin-Math. (d) Union Carbide (d)		Oxirane
F-25	1, 2	propylene oxide	Dow (d)	C. fum.	
	3	1,2-epoxypropane	Olin-Math (d)		
F-26	1, 2	benzene	Plastics and Coal (d)	C. fum.	
	3	benzol			
F-27	1, 2	naphthalene	Plastics and Coal (d)	C. fum. MP	
F-28	1	hydrogen cyanide	Amer. Cyan. (d)	C. fum.	HCN
	2	hydrocyanic acid			prussic acid (in H_2O)
F-29	1, 2	acrylonitrile	Amer. Cyan. (d)	C. fum.	VCN
	3	vinyl cyanide			
F-30	1, 2	carbon disulfide	Stauffer (d)	C. fum.	CS_2
	3	carbon bisulfide	Westvaco (d)		
F-31	1, 2	sodium methyldithio = carbamate	Stauffer (d)	Nem. S. fum.	N-869 Vapam

Code	Auth.	Chemical Name	Manufacturer of Chemical and Availability	Chemical Use	Other Designations for Chemical and its Compositions
F-32	1, 2	sulfur dioxide	General Chem. (d) Monsanto (d) Olin-Math. (d)	C. fum.	SO_2
F-33	1, 2 3	chloroform trichloromethane	Frontier (d)	C. fum.	
		Heterocyclic Compounds			
H-1	1, 2	phenothiazine	Dow (a) DuPont (a)	Ins.	
H-2	1 2	phenothioxin phenoxathiin	Dow (a)	Ins.	
H-3	1, 2 3 3	nicotine *l*-1-methyl-2-(3-pyridyl)-pyrrolidine *l*-3-(1-methyl-2-pyrrolidyl)-pyridine	Diamond Alkali (d) Tobacco By-Products (a)	Ins.	Black Leaf (40 nicotine (sulfate)
H-4	1 2	2-hydroxy-2,4,4,7,4′-pentamethyl flavan 2,4,4,4′,7-pentamethyl-2′-flavanol	DuPont (a)	Acar.	Flavan IN-531
H-5	1 2 3	dibenzo-gamma-pyrone 9-xanthenone xanthone	General Chem. (b)	Ins. Acar.	Genicide E-6
H-6	1, 2	2,3-quinoxalinedithiol cyclic trithiocarbonate	Bayer (?) Chemagro (b)	Acar.	Bayer 30686
H-7	1, 2	tetrahydro-5-(2-hydroxyethyl)-3-methyl-2*H*-1,3,5-thiadiazine-2-thione	Bayer (?) Vero Beach (b)	Nem.	Bayer 29759
		Miscellaneous Compounds			
M-1	1, 2 3 3	azobenzene diphenyl diimide azobenzide	? (?)	Acar.	*azobenzene*
M-2	1 2	di(4-chlorophenoxy)methane bis(*p*-chlorophenoxy)methane	Dow (c)	Acar.	Neotran K–1875, DCPM
M-3	1, 2	pentachlorophenol and its sodium salt	Dow (d) Monsanto (d)	Ins.	Dowicide 7 Dowicide G Santobrite
M-4	1, 2 3	*o*-phenylphenol and its sodium salt 2-hydroxydiphenyl and its sodium salt	Dow (d)	Acar.	Dowicide 1 Dowicide A
M-5	1 2 3	styrene dibromide (1,2-dibromoethyl)benzene α,β-dibromoethylbenzene	Dow (b)	Ins.	Dowspray 9
M-6	1, 2 3	phthalonitrile 1,2 dicyanobenzene	Plastics and Coal (b)	Ins.	
M-7	1, 2	creosote	Plastics and Coal (d)	Ins.	Creosote oil
M-8	1 2	9,9′-bifluorylidene Δ9,9′-bifluorene	Union Carbide (?)	Ins.	6812
M-9	1, 2	fluoroacetamide	Plant Prot. (b)	Sys.	Sistan

Code	Auth.	Chemical Name	Manufacturer of Chemical and Availability	Chemical Use	Other Designations for Chemical and its Compositions
		Nitrophenyl Compounds and Derivatives			
N-1	1, 2 3	4,6-dinitro-*o*-cresol, sodium salt 2,4-dinitro-6-methylphenol, sodium salt	Standard Agri. (d)	Ins.	*dinitrocresol* DNOC DNC Elgetol 30
N-2	1 2 3	4,6-dinitro-*o*-*sec*-butylphenol, triethanolamine salt 2-*sec*-butyl-4,6-dinitrophenol, 2,2′,2″-nitrilotriethanol salt 2-(1-methyl-*n*-propyl)-4,6-dinitrophenol, triethanolamine salt	Dow (d) Standard Agri. (d)	Ins.	*dinitrobutylphenol* Dinoseb DN-289 DNBP DNOSBP DNSBP Elgetol 318
N-3	1 2	4,6-dinitro-*o*-cyclohexylphenol 2-cyclohexyl-4,6-dinitrophenol	Dow (d)	Acar. Ins.	*dinitrocyclohexylphenol* Dinex DN-Dry Mix No. 1 DNOCHP
N-4	1 2	4,6-dinitro-*o*-cyclohexylphenol, *N*,*N*-dicyclohexylamine salt 2-cyclohexyl-4,6-dinitrophenol, dicyclohexylamine salt	Dow (d) Pest Control (?)	Acar.	DN-111 Dynone II
N-5	1 2 3	dinitro (1-methylheptyl) phenyl crotonate 2-(1-methylheptyl)-4,6-dinitrophenyl crotonate 2-capryl-4,6-dinitrophenyl crotonate	Rohm and Haas (d)	Acar.	Karathane Arathane Iscothane CR-1639
N-6	1, 2	2,6-di-*tert*-butyl-4-nitrophenol	Bayer (?) Chemagro (b) Vero (b)	Acar.	Bayer 28589
		Phosphorous-Containing Compounds			
		Part 1 Heterocyclic Derivatives			
P-1	1 2 3 3	4-methylumbelliferone *O*,*O*-diethyl thiophosphate *O*,*O*-diethyl *O*-(4-methyl-umbelliferone) phosphorothioate *O*,*O*-diethyl *O*-(2-oxo-1-2H-benzopyran-7-yl) thiophosphate *O*,*O*-diethyl thiophosphoric acid ester of 7-hydroxy-4-methylcoumarin	Bayer (?)	Ins.	Potasan E-838
P-2	1 2 3	4-methylumbelliferone *O*,*O*-dimethyl thiophosphate *O*,*O*-dimethyl *O*-(4-methyl=umbelliferone) phosphorothioate *O*,*O*-dimethyl *O*-(2-oxo-1-2H-benzopyran-7-yl) thiophosphate	Bayer (?)	Ins.	Methyl Potasan
P-3	1 2 3 3	*O*,*O*-diethyl *O*-3-chloro-4-methyl-2-oxo-2H-1-benzopyran-7-yl phosphorothioate *O*-(3-chloro-4-methylum=belliferone) *O*,*O*-diethyl phosphorothioate *O*,*O*-diethyl *O*-(3-chloro-4-methyl-7-coumarinyl) phos=phorothioate 3-chloro-4-methylumbelli=ferone, *O*,*O*-diethyl thiophosphate	Bayer (?) Chemagro (d)	Ins. Sys.a.	Bayer 21/199 CO-RAL Muscotox

Code	Auth.	Chemical Name	Manufacturer of Chemical and Availability	Chemical Use	Other Designations for Chemical and its Compositions
P-4	1	*O,O*-dimethyl *O*-3-chloro-4-methyl-2-oxo-2H-1-benzopyran-7-yl phosphorothioate	Bayer (a)	Ins.	Bayer 21/200
	2	*O*-(3-chloro-4-methylumbelli = ferone) *O,O*-dimethyl phos = phorothioate			
	3	3-chloro-4-methylumbelli = ferone, *O,O*-dimethyl thio = phosphate			
P-5	1, 2	2,3-*p*-dioxanedithiol *S,S*-bis (*O,O*-dimethyl phosphoro = dithioate)	Hercules (b)	Acar. Ins.	Hercules AC-528 Delnav Navadel
P-6	1	*O,O*-diethyl *O*-(2-isopropyl-6-methyl-4-pyrimidyl) thiophosphate	Geigy (d)	Acar. Ins.	Diazinon Basudin G-24480
	2	*O,O*-diethyl *O*-(2-isopropyl-6-methyl-4-pyrimidinyl) phosphorothioate			
P-7	1	*O,O*-diethyl *O*-3-(2-propyl-6-methyl-4-pyrimidinyl)-thiophosphate	Geigy (a)	Ins.	Pirazinon Pyrazinon G-24622
	2	*O,O*-diethyl *O*-3-(6-methyl-2-propyl-4-pyrimidinyl) phosphorothioate			
P-8	1	*O,O*-diethyl *O*-(3-methyl-5-pyrazolyl) phosphate	Geigy (a)	Ins.	Pyrazoxon G-24483
	2	diethyl 3-methyl-5-pyrazolyl phosphate			
P-9	1	*O,O*-diethyl *O*-3-methylpyra = zolyl (5) thiophosphate	Geigy (a)	Ins.	Pyrazothion G 23027
	2	*O,O*-diethyl *O*-3-methyl-5-pyra = zolyl phosphorothioate			
P-10	1, 2	*O,O*-diethyl *O*-2-pyrazinyl phosphorothioate	Amer. Cyan. (b)	Ins. Acar. Sys.a. Nem.	EN 18131
P-11	1	*O,O*-diethyl *O*-[6-(3(2H)-pyridazinonyl)]phosphorothioate	Amer. Cyan. (a)	Ins.	Amer. Cyan. 12415
	2	*O*-(1,6-dihydro-6-oxopyri = dazin-3-yl) *O,O*-diethyl phosphorothioate			
P-12	1	*O,O*-dimethyl *O*-[6(3(2H)-pyridazinonyl)]phosphorothioate	Amer. Cyan. (a)	Ins.	Amer. Cyan. 12433
	2	*O*-(1,6-dihydro-6-oxopyri = dazin-3-yl) *O,O*-dimethyl phosphorothioate			
P-13	1	*O,O*-diethyl *O*-[6-(3(2-phenyl)-pyridazinonyl)] phosphorothioate	Amer. Cyan. (a)	Ins.	Amer. Cyan. 12503
	2	*O*-(1,6-dihydro-6-oxo-1-phenylpyridazin-3-yl) *O,O*-diethyl phosphorothioate			
P-14	1, 2	*O,O*-dimethyl *S*-4-oxo-1,2,3-benzotriazin-3 (4H)-ylmethyl phosphorodithioate	Bayer (?) Chemagro (d)	Ins.	Guthion Gusathion Bayer 17147 17/147
	3	*O,O*-dimethyl *S*-(4-oxo-3H-1,2,3-benzotriazine-3-methyl)-phosphorodithioate			
	3	*O,O*-dimethyl-*S*-(benzazimino = methyl) dithiophosphate			
	3	*S*-(3,4-dihydro-4-oxo-1,2,3-benzotriazin-3-ylmethyl) *O,O*-dimethyl phosphorodithioate			
	3	benzotriazine derivative of a methyl dithiophosphate			

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P-15	1, 2	*O,O*-diethyl *S*-4-oxo-1,2,3-benzotriazin-3(4H-ylmethyl phosphorodithioate *O,O*-diethyl *S*-(4-oxo-3H-1,2,3-benzotriazine-3-methyl) phosphorodithioate *S*-(3,4-dihydro-4-oxo-1,2,3-benzotriazin-3-ylmethyl) *O,O*-diethyl phosphorodithioate benzotriazine derivative of an ethyl dithiophosphate	Bayer (?)	Ins.	Bayer 16259 Ethyl Guthion
P-16	1 2	Naphthaloximido-*O,O*-diethyl phosphorothioate *O,O*-diethyl *O*-naphthalimido phosphorothioate	Bayer (?) Vero (b)	Ins.	Bayer 22408 ENT 24970
P-17		*P*-chloro-2,4-dioxa-5-methyl-*P*-thiono-3-phosphabicyclo = (4.4.0) decane	Carbide (?)	Ins.	8305
Part 2 Aryl Derivatives					
P-18	1, 2 3 3 3	*O,O*-dimethyl *O*-*p*-nitrophenyl phosphorothioate *O,O*-dimethyl *O*-*p*-nitrophenyl thiophosphate dimethyl *p*-nitrophenyl thiono = phosphate dimethyl *p*-nitrophenyl phosphorothionate	Amer. Cyan. (d) Chemagro (d) Monsanto (d) Velsicol (d) Victor (d)	Ins.	*methyl parathion* methyl homologue of parathion Nitrox Bayer E-601
P-19	1, 2 3	*O,O*-dimethyl *O*-*p*-nitrophenyl phosphorothioate, parathion mixture *O,O*-dimethyl *O*-*p*-nitrophenyl thiophosphate and parathion mixture	Bayer (?) Chemagro (d)	Acar. Ins.	Metacide Gearphos
P-20	1 2 3 3 3	*O,O*-diethyl *O*-*p*-nitrophenyl phosphorothioate parathion *O,O*-diethyl *O*-*p*-nitrophenyl thiophosphate diethyl *p*-nitrophenyl thionophosphate diethyl *p*-nitrophenyl phos = phorothionate	Amer. Cyan. (d) Amer. Potash (d) Bayer (?) Monsanto (d) Velsicol (d)	Acar. Ins.	*parathion* Alkron Niran Thiophos Amer. Cyan. 3422 Bayer E-605
P-21	1 2	*O,O*-diethyl *O*-*p*-nitrophenyl phosphate diethyl *p*-nitrophenyl phosphate	Bayer (a)	Ins.	*para-oxon* oxygen analogue of parathion Bayer E-600
P-22	1, 2 3	*O,O*-diisopropyl *O*-*p*-nitrophenyl phosphorothioate *O,O*-diisopropyl *O*-*p*-nitrophenyl thiophosphate	Amer. Cyan. (a)	Ins.	diisopropyl parathion 3456
P-23	1 2 3	ethyl *p*-nitrophenyl benzene thiophosphonate *O*-ethyl *O*-*p*-nitrophenyl phenylphosphonothioate *O*-ethyl *O*-*p*-nitrophenyl benzenethiophosphonate	DuPont (d)	Acar. Ins.	*EPN* EPN-300
P-24	1, 2 3	*O*-(2-chloro-4-nitrophenyl) *O,O*-dimethyl phosphorothioate *O,O*-dimethyl *O*-(2-chloro-4-nitrophenyl) thiophosphate	Amer. Cyan. (c)	Acar. Ins.	*dicapthon* Amer. Cyan. 4124 Di-Captan

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P-25	1	*O,O*-dimethyl *O*-(3-chloro-4-nitrophenyl)thiophosphate	Bayer (?) Chemagro (a)	Ins.	Chlorthion Bayer 22/190
	2	*O*-(3-chloro-4-nitrophenyl) *O,O*-dimethyl phosphorothioate			
P-26	1	methyl-*O*-methyl *O*-2,4-dichloro = phenyl phosphonothioate	Vero (b)	Ins. Sys.	Bayer 30911 ENT 25635
	2	*O*-2,4-dichlorophenyl *O*-methyl methylphosphonothioate			
P-27	1	*O,O*-diethyl *O*-2,4-dichlorophenyl phosphorothioate	Virginia-Carolina (d)	Acar. Ins. Nem.	V-C 1-13 V-C-13 Nemacide
	2	*O*-2,4-dichlorophenyl *O,O*-diethyl phosphorothioate			
	3	*O,O*-diethyl *O*-2,4-dichlorophenyl thiophosphate			
P-28	1, 2	*O*-2,4-dichlorophenyl *O*-methyl isopropylphosphoramidothioate	Dow (c)	Ins. Sys.	Zytron
P-29	1, 2	*O,O*-dimethyl *O*-2,4,5-tri = chlorophenyl phosphorothioate	Dow (d)	Ins. Sys.a.	*ronnel* Dow ET-57 Dow ET-14 Korlan Nankor Trolene
P-30	1, 2	*O*-methyl *O*-2,4,5-trichlorophenyl phosphoramidothioate	Dow (a)	Ins.	Dow ET-15
P-31	1, 2	*O*-4-*tert*-butyl-2-chlorophenyl *O*-methyl methylphosphoramidate	Dow (b)	Ins. Sys.a.	Dowco 132 Ruelene
P-32	1, 2	*O*-4-*tert*-butyl-2-chlorophenyl *O*-methyl methylphosphoramido = thioate	Dow (a)	Ins. Sys.a.	Dowco 109 Narlene
P-33	1, 2	*O*-4-*tert*-butyl-2-chlorophenyl *O*-methyl ethylphosphoramido = thioate	Dow (a)	Ins. Sys.a.	Dowco 105
P-34	1, 2	*O,O*-dimethyl *O*-[4-(methylthio)-*m*-tolyl] phosphorothioate	Chemagro (b) Vero (b)	Acar. Ins.	Baytex Bayer 29493 S 1752 ENT 25540
	3	*O,O*-dimethyl *O*-(3-methyl, 4-methylmercaptophenyl) phos = phorothioate			
	3	*O,O*-dimethyl *O*-4-(methyl = mercapto) 3-methylphenyl thiophosphate			
P-35	1, 2	*O,O*-diethyl *O*-[4-(methylthio)-*m*-tolyl] phosphorothioate	Chemagro (b)	Acar. Ins.	Bayer 29492-x
P-36	1, 2	*O,O*-dimethyl *O*-*p*-(methyl = sulfinyl)phenyl phosphorothioate	Bayer (?)	Ins.	Bayer 25,198
P-37	1, 2	*O,O*-diethyl *O*-*p*-(methyl = sulfinyl)phenyl phosphorothioate	Bayer (?) Vero (b)	Ins. Nem.	Bayer 25,141 ENT 24945
P-38	1, 2	*O,O*-di-*n*-propyl *O*-*p*-(methyl = sulfinyl)phenyl phosphorothioate	Bayer (?)	Ins.	Bayer 25,142
P-39	1, 2	*O,O*-dimethyl *S*-[(*p*-chloro = phenylthio)methyl] phosphoro = dithioate	Stauffer (d)	Acar. Ins.	Methyl Trithion
P-40	1, 2	S-[*p*-chlorophenylthio)methyl] *O,O*-diethyl phosphorodithioate	Stauffer (d)	Acar. Ins.	Trithion R1303
	3	*O,O*-diethyl *p*-chlorophenyl = mercaptomethyl dithiophosphate			
P-41	1, 2	*O,O*-dimethyl *S*-2,5-dichloro = phenylmercaptomethyl phosphorodithioate	Geigy (a)	Ins.	G 30494

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P-42	1, 2	(3,4-dichlorobenzyl)triphenyl = phosphonium chloride	General Dyestuff (d)	MP	Eulan NK Eulan NKU
Part 3 Aliphatic Derivatives					
P-43	1 2 3	tetraethyl pyrophosphate ethyl pyrophosphate, approx. 40% technical bis-*O,O*-diethylphosphoric anhydride	Amer. Potash (d) Monsanto (a) Victor (a) Westvaco (a)	Ins.	*TEPP* TEP Tetron
P-44	1 2	hexaethyl tetraphosphate (contains 12–20% *TEPP*) mixture of ethyl polyphosphates containing 12–20% ethyl pyro = phosphate	Monsanto (a)	Ins.	*HETP* Bladan Nifos
P-45	1 2 3 3	tetraethyl dithiopyrophosphate *O,O,O,O*-tetraethyl dithio = pyrophosphate ethyl thiopyrophosphate bis-*O,O*-diethylthiophosphoric anhydride	Monsanto (a) Victor (a)	Acar. Ins.	*sulfotepp* ASP-47 Dithione Sulfatep TEDTP
P-46	1, 2	tetra-*n*-propyl dithiono = pyrophosphate	DuPont (a)	Acar. Ins.	NPD A-42 E-8573
P-47	1, 2	bis(dialkoxyphosphinothioyl) disulfides (alkyl ratio 25% isopropyl, 75% ethyl)	Niagara (d)	Ins.	Phostex Niagara 1137
P-48	1, 2 3	*O,O,O′,O′*-tetraethyl *S,S′*-methylene bisphosphorodithioate [bis(*S*-diethoxyphosphinothioyl) = mercapto]methane	Niagara (d)	Acar. Ins.	*ethion* Nialate Niagara 1240
P-49	1, 2	1-(dimethoxyphosphinyl) = vinyl dimethyl phosphate	Monsanto (b)	Ins. Acar. Sys.	CP10502
P-50	1, 2	dimethyl (2,2,2-trichloro-1-hydroxyethyl)phosphonate	Bayer (?) Chemagro (d)	Ins.	Dipterex Bayer L13/59 Dylox
P-51	1 2	*O,O*-dimethyl 2,2-dichlorovinyl phosphate 2,2-dichlorovinyl dimethyl phosphate	Montrose (c) Norda (d)	C. fum. Ins.	*DDVP* Nerkol
P-52	1 2	*O,O*-diethyl 2-chlorovinyl phosphate 2-chlorovinyl diethyl phosphate	Shell (a)	Ins. Sys.	Shell OS 1836
P-53	1 2 3 3	1-methoxycarbonyl-1-propen-2-yl dimethyl phosphate, 2-methoxycarbonyl-1-methyl = vinyl dimethyl phosphate 1-carbomethoxy-1-propen-2-yl dimethyl phosphate *O,O*-dimethyl 1-carbomethoxy-1-propen-2-yl phosphate	Shell (c)	Ins. Sys.	Phosdrin OS 2046
P-54	1 2	2-carbethoxy-1-methylvinyl diethyl phosphate 2-ethoxycarbonyl-1-methylvinyl diethyl phosphate	Shell (a)	Ins.	OS1808

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P-55	1, 2	2-dimethylcarbamoyl-1-methyl=vinyl dimethyl phosphate	Shell (?)	Ins.	SD 3562
	3	3-(dimethoxyphosphinyloxy)-*N*,*N*-dimethylcrotonamide			
P-56	1, 2	2-chloro-2-diethylcarbamoyl-1-methylvinyl dimethyl phos=phate	Shell (?)	Ins.	*phosphamidon* ML-97 OR-1191
	3	1-chloro-1-diethylcarbamoyl-1-propen-2-yl dimethyl phosphate			
P-57	1, 2	1,2-dibromo-2,2-dichloroethyl dimethyl phosphate	Cal. Spray	Acar. Ins.	DIBROM RE 4355
P-58	1, 2	*O*,*O*-diethyl *S*-ethylthiomethyl phosphorodithioate	Amer. Cyan. (d)	Acar. Ins.	*phorate* Thimet
	3	*O*,*O*-diethyl *S*-ethylmercapto=methyl dithiophosphate		Sys.	L 11/6 AC 3911
P-59	1, 2	*O*,*O*-diethyl *S*-*n*-propylthiomethyl phosphorodithioate	Amer. Cyan. (a)	Acar. Ins. Sys.	Amer. Cyan. 12009
	3	*O*,*O*-diethyl *S*-*n*-propylmer=captomethyl dithiophosphate			
P-60	1, 2	*O*,*O*-diethyl *S*-isopropyl=thiomethyl phosphorodithioate	Amer. Cyan. (a)	Acar. Ins. Sys.	Amer. Cyan. 12008
	3	*O*,*O*-diethyl (*S*-isopropyl=mercaptomethyl) dithiophosphate			
P-61	1, 2	*O*,*O*-diisopropyl *S*-isopro=pylthiomethyl phosphoro=dithioate	Amer. Cyan. (a)	Acar. Ins. Sys.	Amer. Cyan. 12013
	3	*O*,*O*-diisopropyl *S*-isopropyl=mercaptomethyl dithiophosphate			
P-62	1	*O*,*O*-dimethyl *O*(and *S*) (2-ethylthio)ethyl phosphoro=thioates	Bayer (?) Chemagro (a)	Acar. Ins. Sys.	*methyl demeton* meta-Systox Methyl Systox Bayer 21/116
	2	mixture of *S*-(and *O*) (2-ethylthio)ethyl *O*,*O*-dimethyl phosphorothioates			
	3	mixture of *O*,*O*-dimethyl *S*-ethylmercaptoethyl thio=phosphate and *O*,*O*-dimethyl *O*-ethylmercaptoethyl thio=phosphate			
P-63	1	*O*,*O*-dimethyl *S*-ethyl thioethyl phosphorodithionate	Bayer (?)	Ins.	Bayer 23129
	2	*S*-ethyl thioethyl *O*,*O*-dimethyl phosphorodithioate			
P-64	1	*O*,*O*-dimethyl *S*-(2-isopropyl) ethylsulfinyl thiolphosphate	Bayer (?) Vero (b)	Ins. Sys.	Thiometan Bayer 23655 ENT 25674
	2	*S*-2-isopropylethylsulfinyl *O*,*O*-dimethyl phosphorothioate			
P-65	1	*O*,*O*-dimethyl *S*-(2-ethylethyl)=sulfinyl phosphorodithioate	Bayer (?)	Ins.	Bayer 23453
	2	*S*-(2-ethylsulfinylethyl) *O*,*O*-dimethyl phosphorodithioate			
P-66	1	*O*,*O*-diethyl *O*(and *S*)-2-(ethylthio)ethyl phosphoro=thioates	Bayer (?) Chemagro (d)	Acar. Ins. Sys.	*demeton* Systox E-1059 Bayer 8173
	2	mixture of *O*,*O*-diethyl *S*-(and *O*) (2-ethylthio)ethyl phosphoro=thioates			
	3	mixture of *O*,*O*-diethyl *S*-ethyl=mercaptoethyl thiophosphate and *O*,*O*-diethyl *O*-ethylmercaptoethyl thiophosphate			
	3	a trialkyl thiophosphate			

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P-67	1, 2	*O,O*-diethyl *S*-2-(ethylthio) = ethyl phosphorodithioate	Bayer (?) Chemagro (d)	Acar. Ins. Sys.	Bayer 19639 Di-Syston Ekatine dithiodemeton
P-68	1, 2	[2-(diethoxyphosphinylthio) = ethyl] ethylmethylsulfonium methyl sulfate	Bayer (?)	?	Bayer 28/63
P-69	1	*O,O*-diethyl *S*-(β-diethylamino)-ethyl phosphorothiolate hydrogen oxalate	Chipman (b)	Acar. Ins.	Chipman R-6199 Tetram Hydrogen oxalate of amiton
	2	*S*-(2-diethylaminoethyl) *O,O*-diethyl phosphorothioate hydrogen oxalate			
P-70	1	*O,O*-dimethyl dithiophosphate of diethyl mercaptosuccinate	Amer. Cyan. (d)	Ins.	*malathion* Malathon 4049
	2	malathion			
	3	*O,O*-dimethyl *S*-(1,2-dicarb = ethoxyethyl) dithiophosphate			
	3	*S*-[1,2-bis(ethoxycarbonyl)-ethyl]*O,O*-dimethyl phos = phorodithioate			
	3	*O,O*-dimethyl phosphorodi = thioate ester with diethyl mercaptosuccinate			
P-71	1, 2	*S*-carbamoylmethyl *O,O*-dimethyl phosphorodithioate	Amer. Cyan. (a)	Ins. Sys.a.	3869
	3	*S*-carbamylmethyl *O,O*-dimethyl dithiophosphate			
P-72	1	*O,O*-dimethyl *S*(*N*-methyl = carbamoylmethyl) phosphoro = dithioate	Amer. Cyan. (b) Fisons (?)	Acar. Ins. Sys.a.	*dimethoate* AC 12880 ENT 24650 NC-262
	2	*S*-methylcarbamoylmethyl *O,O*-dimethyl phosphorodithioate			
	3	*O,O*-dimethyl *S*-α-mercapto-*N*-methylacetamido dithiophos = phate			
P-73	1	*O,O*-dimethyl *S*-(*N*-ethyl = carbamoylmethyl) phosphoro = dithioate	Amer. Cyan. (b)	Acar. Ins. Sys.a.	E. I. 18706
	2	*S*-ethylcarbamoylmethyl *O,O*-dimethyl phosphorodithioate			
P-74	1	*O,O*-dimethyl *S*-(*N*-isopropyl = carbamoylmethyl) phosphoro = dithioate		Ins.	Fostion MP
	2	*S*-(isopropylcarbamoylmethyl) *O,O*-dimethyl phosphorodithioate			
P-75	1, 2	*O,O*-diethyl *S*-isopropyl = carbamoylmethyl phosphoro = dithioate	Amer. Cyan. (a)	Ins.	Amer. Cyan. 18682 Fostion
P-76	1, 2	*O,O*-dimethyl *S*-(2-oxo-2-ureidoethyl) phosphorodithioate	Amer. Cyan. (a)	Acar. Ins. Sys.	3901
	3	*O,O*-dimethyl *S*-α-mercapto = acetylurea dithiophosphate			
P-77	1	diisopropyl ester of diethyl dithiocarbamyl phosphorothioic acid	Holcomb (a)	Acar. Ins.	Holcomb Compd. 326 ENT-24,725
	2	*S*-diethylthiocarbamoyl *O,O*-diisopropyl phosphorothioate			
	3	*O,O*-diisopropyl dithiophosphoric acid ester of *N,N*-diethyldithio = carbamic anhydrosulfide			
	3	*N,N*-diethylthiocarbamyl *O,O*-diisopropyl dithiophosphate			

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P-78	1	bis(dimethylamino)fluoro = phosphine oxide	Fisons (a)	Acar.	*dimefox*
			Pest Control (a)	Ins.	DMF
	2	tetramethylphosphorodiamidic fluoride		Sys.	Hanane
					Pestox 14
					Terra Sytam
P-79	1, 2	octamethylpyrophosphoramide	Fisons (d)	Acar.	*schradan*
	3	bis(dimethylamino)phosphoric anhydride	Monsanto (a)	Ins.	OMPA
			Pest Control (a)	Sys.	Pestox III
	3	bis-*N*,*N*,*N*′,*N*′-tetramethylphos = phorodiamidic anhydride			Sytam
	3	tetrakisdimethylaminophos = phonous anhydride			
P-80	1	*N*,*N*′-diisopropyldiamido = phosphoryl fluoride	Fisons (a)	Ins.	Isopestox
			Pest Control (a)	Sys.	mipafox
	2	*N*,*N*′-diisopropylphosphoro = diamidic fluoride			Pestox 15
	3	bis(monoisopropylamino) fluorophosphine oxide			
		Attractants			
Q-1	1, 2	eugenol	Norda (d)	Att.	eugenol
	3	4-allyl-2-methoxyphenol	Shulton (d)		
	3	4-allylguaiacol	Penick (d)		
Q-2	1, 2	4-allyl veratrole	Fritzsche (d)	Att.	ENT 21040
	3	methyl eugenol			
Q-3	1, 2	4-(*p*-acetoxyphenyl)-2-butanone	Trubek (?)	Att.	ENT-31833
	3	p-(3-oxobutyl)phenyl acetate			Q-Lure
Q-4	1, 2	*sec*-butyl 6-methyl-3-cyclo = hexene-1-carboxylate	USDA (a)	Att.	*siglure*
			Trubek (a)		ENT 21489
			Union carbide (a)		
Q-5	1, 2	*sec*-butyl 4(or 5)-chloro-2-methylcyclohexanecarboxylate	USDA (a)	Att.	*medlure*
			Trubek (?)		ENT 30992
Q-6	1, 2	*tert*-butyl 4(or 5)-chloro-2-methylcyclohexanecarboxylate	USDA	Att.	trimedlure
					ENT 31560
		Repellents			
R-1	1, 2	2-ethyl-1,3-hexanediol	Union Carbide (d)	RP	*ethyl hexanediol*
					Rutgers 612
					"6-12"
R-2	1, 2	2-butyl-2-ethyl-1,3-propanediol	Montrose (d)	RP	BEP
			Union Carbide (d)		
R-3	1, 2	2-phenylcyclohexanol and 2-cyclohexylcyclohexanol mixture	Dow (c)	RP	NMRI-201
					448
R-4	1	butoxy polypropylene glycol	Union Carbide (d)	Acar.	*butoxy polypropylene glycol*
	2	butoxypropanediol polymer		RP	Crag Fly Repellent
	3	polypropylene glycol butyl ether			Exp. Miticide No. 7

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R-5	1	diethylene glycol mono butyl ether acetate	Union Carbide (a)	RP	Sta-way
	2	2-(2-butoxyethoxy)ethyl acetate			
R-6	1, 2	dimethyl *cis*-bicyclo = [2.2.1]-5-heptene-2,3-dicarboxylate	Union Carbide (d)	RP	*dimethyl carbate* 3916
R-7	1, 2	butyl 3,4-dihydro-2,2-di = methyl-4-oxo-2H-pyran-6-carboxylate	Fairfield (d) Kilgore (a) U.S. Industrial (a)	RP	Indalone butopyronoxyl
	3	2,2-dimethyl-6-carbobutoxy-2,3-dihydro-4-pyrone			
	3	*n*-butyl mesityl oxide oxalate			
R-8	1, 2	di-*n*-butyl adipate	Union Carbide (b)	RP	Exp. Tick Rep. 3PS
R-9	1, 2	di-*n*-butyl phthalate	Comm. Solv. (d) Kolker (d) Monsanto (d) Montrose (d) Plastics and Coal (d)	RP	DBP
	3	dibutyl phthalate			
	3	dibutyl 1,2-benzenedicarboxylate			
R-10	1, 2	dimethyl phthalate	Kolker (d) Monsanto (d) Plastics and Coal (d)	RP	DMP
	3	dimethyl 1,2-benzenedicar = boxylate			
R-11	1, 2	benzyl benzoate	Kolker (d) Monsanto (d) Montrose (d)	RP	
R-12	1, 2	di-*n*-propyl isocincho = meronate	M.G.K. (c)	RP	MGK Repellent 326 R-326
	3	di-*n*-propyl 2,5-pyridinedicar = boxylate			
R-13	1, 2	dibutyl succinate	Glenn (d)	RP	Tabutrex
R-14	1, 2	*N*-butylacetanilide	Dow (a) Montrose (d) Union Carbide (d)	RP	BAA
R-15	1, 2	*N,N*-diethyl-*m*-toluamide	Cowles Chem. Hercules (d) Montrose (c) USDA (a)	RP	*diethyltoluamide* Delphene M-DET ENT 20218
R-16	1, 2	*N,N*-diethyl-*o*-toluamide	Montrose (c)	RP	O-DET Detamide
R-17	1, 2	*o*-chloro-*N,N*-diethylbenz = amide	Geigy (b)	RP	Kik G-18359
R-18	1	2,3,4,5-bis(Δ2-butylene)-tetrahydrofurfural	M.G.K. (d)	RP	MGK Repellent 11 R-11
	2	1,5a,6,9,9a,9b-hexahydro-4a(4H)-dibenzofuran = carboxaldehyde			
R-19	1	3-chloropropyl *n*-octyl sulfoxide	MGK (b)	RP	MGK Repellent 1207 Phillips R-1207
Sulfonates, Sulfides, Sulfones, Sulfonamides, Sulfites					
S-1	1, 2	*p*-chlorophenyl *p*-chloro = benzenesulfonate	Diamond Alkali (d) Dow (d) Murphy (d)	Acar.	*ovex* CPCBS chlorfenson Chlorfensone Miticide K-101 Ovochlor Ovotran K-6,451 C-854 C-1006

Code	Auth.	Chemical Name	Manufacturer of Chemical and Availability	Chemical Use	Other Designations for Chemical and its Compositions
S-2	1	2,4-dichlorophenyl ester of benzenesulfonic acid	General Chem. (d)	Acar.	Genite Genitol 923 923
	2	2,4-dichlorophenyl benzene = sulfonate			
	3	dichlorophenyl benzene = sulfonate			
S-3	1, 2	*p*-chlorophenyl benzene = sulfonate	General Chem. (b) Murphy (d)	Acar.	CPBS fenson Fensone Murvesco PCPBS 928
S-4	1, 2	*p*-chlorophenyl phenyl sulfone and related sulfones	Stauffer (d)	Acar.	Sulphenone R-242
S-5	1, 2	*p*-chlorophenyl 2,4,5-tri = chlorophenyl sulfone	Niagara (d)	Acar.	Tedion Tedion V-18
	3	2,4,4′,5-tetrachlorodiphenyl sulfone (80% technical)			
S-6	1, 2	chloromethyl *p*-chlorophenyl sulfone	German (?)	Ins.	*lauseto neu*
S-7	1, 2	*p*-chlorobenzyl *p*-chlorophenyl sulfide	Boots Pure Drug (d)	Acar.	*chlorbenside* Chlorparacide Chlorsulphacide Mitox
S-8	1, 2	lauryl 2-thiazolinyl sulfide	DuPont (a)	Acar.	L-2TS IN-4200
S-9	1, 2	*p*-chlorobenzyl *p*-fluorophenyl sulfide	Boots Pure Drug (b)	Acar.	fluorbenside HRS 942
S-10	1	2-(*p-tert*-butylphenoxy) = isopropyl 2-chloroethyl sulfite	Naugatuck (d)	Acar.	Aramite alkyl aryl sulfite 88R
	2	2-(*p-tert*-butylphenoxy)-1-methylethyl 2-chloroethyl sulfite			
	3	β-chloroethyl β-(*p-tert*-butylphenoxy)-α-methyl = ethyl sulfite			
S-11	1, 2	3,4-dichloro-4′-nitro = benzenesulfonanilide	Rohm and Haas (a)	Ins.	HE-761
	3	3,4-dichlorobenzenesulfon-4-nitroanilide			
S-12	1, 2	3,4-dichloro-*N*-methyl = benzenesulfonamide	General Dyestuff (?)	Ins. MP	Eulan BL
S-13	1	2,2′-dihydroxy-3,5,3′,5′-tetrachlorotriphenylmethane-2″-sodium sulfonate	General Dyestuff (d)	MP	Eulan CN (New)
	2	sodium α,α-bis(3,5-dichloro-2-hydroxyphenyl)-o-toluene = sulfonate			
S-14	1	2,2′-dihydroxy-3,5,3′,5′,4″-pentachlorotriphenylmethane 2″-sodium sulfonate	General Dyestuff (?)	MP	Eulan CN
	2	sodium 5-chloro-α,α-bis-(3,5-dichloro-2-hydroxy = phenyl)o-toluenesulfonate			

Code	Auth.	Chemical Name	Manufacturer of Chemical and Availability	Chemical Use	Other Designations for Chemical and its Compositions
S-15	1	sodium salt of *N*-(3,4-dichlorophenyl)-*N'*-2(2-sulfo-4-chlorophenoxy)-5-chlorophenyl urea	Geigy (d)	MP	Mitin FF
	2	sodium 5-chloro-2-(4-chloro-2-(3-(3,4-dichlorophenyl)-ureido)phenoxy)benzenesul=fonate			
	3	*N*-3,4-dichlorophenyl *N'*5-chloro-2-(2-sodium sulfonyl-4-chlorophenoxy)phenyl urea			
		Thiocyanates			
T-1	1	β-thiocyanoethyl laurate (coconate)	Rohm and Haas (d)	Ins.	Lethane 60
	2	2-thiocyanoethyl laurate			
T-2	1	β,β'-dithiocyano diethyl ether	Rohm and Haas (d)	Ins.	Lethane A-70
	2	diethylene glycol dithiocyanate			
	3	bis(2-thiocyanoethyl) ether			
T-3	1	β-butoxy-β'-thiocyanodiethyl ether	Rohm and Haas (d)	Ins.	Lethane 384
	2	2-(2-butoxyethoxy)ethyl thiocyanate			
	3	butyl carbitol rhodanate			
	3	butyl carbitol thiocyanate			
T-4	1, 2	*n*-dodecyl thiocyanate	DuPont (a)	Ins.	Loro
	3	lauryl rhodanate			"Lorol thiocyanate"
T-5	1, 2	isobornyl thiocyanoacetate —82%, other related terpenes —18%	Hercules (d)	Ins.	Thanite
	3	terpinyl thiocyanoacetate			
	3	mixture of fenchyl and isobornyl thiocyanoacetates			
		Carbamates			
X-1	1	dimethyl 5-(1-isopropyl-3-methylpyrazolyl)carbamate	Geigy (b)	Ins.	Isolan G23611
	2	1-isopropyl-3-methyl-5-pyrazolyl dimethylcarbamate			
X-2	1	dimethyl 5-(3-methyl-1-phenylpyrazolyl)carbamate	Geigy (b)	Ins.	Pyrolan G22008
	2	3-methyl-1-phenyl-5-pyrazolyl dimethylcarbamate			
X-3	1	5,5-dimethyldihydroresorcinol dimethylcarbamate	Geigy (b)	Ins.	*dimetan* G-19258
	2	dimethyl 5,5-dimethyl-3-oxo-1-cyclohexen-1-yl carbamate			
	3	dimethyl-3-hydroxy-5,5-dimethyl-1-oxo-2-cyclohexenyl carbamate			
X-4	1, 2	2-*n*-propyl-4-pyridinyl (6) dimethylcarbamate ?	Geigy (a)	Ins.	Pyramat G23330
X-5	1	1-naphthyl *N*-methylcarbamate	Union Carbide (d)	Ins.	Sevin 7744
	2	1-naphthyl methylcarbamate			
	3	α-naphthyl *N*-methylcarbamate			
X-6	1	dimethyl carbamate of 2-dimethyl aminomethyl phenol, hydro=chloride	Rohm and Haas	Ins.	C-140
	2	α-dimethylamino-*o*-tolyl dimethylcarbamate, hydrochloride			

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K-1875	M-2
K-3,926	D-13
K-6,451	S-1
L-2TS	S-8
L 11/6	P-58
Bayer L13/59	P-50
M-DET	R-15
MeBr	F-19
MGK 264	A-8
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MGK Repellent 326	R-12
MGK Repellent 1207	R-19
ML-97	P-56
Fostion M P	P-74
Mr-30	D-19
MS-60	D-12
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NC-262	P-72
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88R	S-10
R-11	R-18
R-242	S-4
R-326	R-12
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R1303	P-40
Chipman R-6199	P-69
RE 4355	P-57
52-RL-45	C-13
52-RL-71	C-12
S 1752	P-34
SD 3562	P-55
SD 4402	C-15
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TEP	P-43
TEPP	P-43
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Attractant (Att.)
Q-1, Q-2, Q-3, Q-4, Q-5, Q-6.

Commodity Fumigant (C.fum.)
F-1 through F-6, F-9 through F-15, F-19 through F-30, F-32, F-33, P-51.

Insecticide (Ins.)
A-1, A-10, A-11, B-1, B-2, B-3, B-5, B-6, B-7, B-8, C-1 through C-15, D-1 through D-12, H-1, H-2, H-3, H-5, M-3, M-5, M-6, M-7, M-8, N-1, N-2, N-3, P-1 through P-41, P-43 through P-67, P-69 through P-80, S-6, S-11, S-12, T-1 through T-5, X-1 through X-6.

Mothproofer (MP)
D-1, D-9, F-12, F-27, P-42, S-12, S-13, S-14, S-15.
Nematocide (Nem.)
F-7, F-8, F-16, F-18, F-20, F-31, H-7, P-10, P-27, P-37.
Repellent (RP)
R-1 through R-19
Soil fumigants (S. fum.)
F-7, F-8, F-14, F-16, F-18, F-19, F-20, F-31.
Insecticide Activator (Synergist) (Syn.)
A-1 through A-11, D-12.
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M-9, P-26, P-28, P-49, P-52, P-53, P-58, P-59, P-60, P-61, P-62, P-64, P-66, P-67, P-76, P-78, P-79, P-80.

INSECTICIDE MANUFACTURER'S INDEX

Allied Chemical Corporation:
General Chemical Division, Research Laboratory, P. O. Box 405, Morristown, New Jersey
C-1, C-11, D-1, D-2, D-19, F-32, H-5, S-2, S-3.
Plastic and Coal Chemicals Division, 40 Rector Street, New York 6, N. Y.
F-26, F-27, M-3, M-6, R-9, R-10.
Solvay Process Division, 40 Rector Street, New York 6, N. Y.
F-1, F-12, F-13.
Allied Chemical and Dye Corporation (see Allied Chemical Corporation)
American Cyanamid Company, Research Division, 1937 West Main St., Stamford, Connecticut
F-28, F-29, P-10, P-11, P-12, P-13, P-18, P-20, P-22, P-24, P-58, P-59, P-60, P-61, P-70, P-71, P-72, P-73, P-75, P-76.
American Potash and Chemical Corporation, Agricultural Chemicals Department (Eston), 3030 West Sixth Street, Los Angeles 54, California
F-17, F-19, F-20, P-20, P-43.
Bayer, A. G. Farbenfabriken, Leverkusen Bayerwerk Western Germany (see Vero Beach Laboratories and Chemagro Corp.)
H-6, H-7, N-6, P-1, P-2, P-3, P-4, P-14, P-15, P-16, P-19, P-20, P-21, P-25, P-36, P-37, P-38, P-50, P-62, P-63, P-64, P-65, P-66, P-67, P-68.
Benzol Products Company, 237 South Street, Newark 5, New Jersey
B-5, B-8.
Boots Pure Drug Company Ltd., Research Department, Island Street, Nottingham, England
S-7, S-9.
California Spray-Chemical Corporation (Subsidiary of California Chemical Company) Lucas Street and Ortho Way, Richmond, California
P-57.
Carbide and Carbon Chemicals Company (see Union Carbide Corporation)
Chemagro Corporation, P.O. Box 4913, Hawthorn Road, Kansas City 20, Missouri (jointly owned by Farbenfabriken Bayer and Pittsburgh Coke and Chemical)
H-6, N-6, P-3, P-14, P-18, P-19, P-25, P-34, P-35, P-50, P-62, P-66, P-67.
Chipman Chemical Company, Inc., Bound Brook, New Jersey
P-69.
Columbia-Southern (see Pittsburgh Plate Glass Company)
Commercial Solvents Corporation, Terre Haute, Indiana
D-5, D-6, D-7, D-10, D-11, F-15, F-23, R-9.
Cowles Chemical Company, Skaneateles Falls, New York
R-15.
Diamond Alkali Company, Chlorinated Products Division, Union Commerce Building, Cleveland 14, Ohio (Includes former Tobacco By-Products and Diamond Black-Leaf,)
C-1, C-2, D-1, F-1, F-2, F-5, F-6, F-16, H-3, S-1.
Dodge and Olcott Incorporated, 180 Verick St., New York 14, N. Y.
Q-1.
Dow Chemical Company, The, Midland, Michigan
D-13, F-1, F-2, F-3, F-4, F-5, F-6, F-7, F-8, F-9, F-11, F-12, F-13, F-14, F-17, F-18, F-19, F-20, F-21, F-22, F-24, F-25, H-1, H-2, M-2, M-3, M-4, M-5, N-2, N-3, N-4, P-28, P-29, P-30, P-31, P-32, P-33, R-3, R-14, S-1.
duPont deNemours, E. I., and Company, Inc., Industrial and Biochemicals Department, Wilmington 98, Delaware
A-9, D-4, H-1, H-4, P-23, P-46, S-8, T-4.
Eston Chemical Company (see American Potash and Chemical Corp.)
Fairfield Chemicals (see Food Machinery and Chemical Corporation)
Fisons Pest Control Ltd., Cambridge, England
N-4, P-72, P-78, P-79, P-80.
Food Machinery and Chemical Corporation:
Fairfield Chemical Division, 1701 Patapsco Avenue, Baltimore 3, Maryland
A-1, A-2, B-1, B-4, B-5, B-8, R-7.
Niagara Chemical Division, Middleport, New York
C-14, P-47, P-48, S-5.
Westvaco Chlor-Alkali Division, South Charleston, West Virginia
F-1, F-18, F-20, F-30, P-43.
Fritzsche Bros. Inc., Port Authority Bldg., New York, N. Y.
Q-1, Q-2.
Frontier Chemical Company (see Union Chemical and Materials Corporation)
Geigy Chemical Corporation, Geigy Agricultural Chemicals (Division), P.O. Box 430, Yonkers, New York
D-1, D-8, D-15, D-18, P-6, P-7, P-8, P-9, P-41, R-17, S-15, X-1, X-2, X-3, X-4.
General Aniline and Film Corporation, Central Research Laboratory, Coal and Lincoln Streets, Easton, Pennsylvania
P-42, S-12, S-13, S-14.
General Chemical Company (see Allied Chemical Corporation)
General Dyestuff (see General Aniline and Film Corporation)
Glenn Chemical Company, 2735 North Ashland Avenue, Chicago 14, Illinois
R-13.
Goodrich, B. F. Company, B. F. Goodrich Chemical Company (Division), 3135 Euclid Avenue, Cleveland 15, Ohio
C-6.
Great Lakes Oil and Chemical Co., Great Lakes Chemical Corporation (Division) 500 Fifth Avenue, New York 36, New York
F-19, F-20.
Hercules Powder Company, Inc., Naval Stores Department, Agricultural Chemicals Laboratory, Wilmington 99, Delaware
C-5, P-5, T-4.
Heyden Newport Chemical Corporation, 342 Madison Avenue, New York 17, New York
C-6.

Holcomb, J. I., Manufacturing Company, Research Laboratory, 4401 Cold Spring Road, Indianapolis 8, Indiana
P-77.

Hooker Electrochemical Corporation, Eastern Chemicals Division, Niagara Falls, New York
C-1, C-2, F-5, F-12, F-13.

Hyman, Julius (see Shell Chemical Corporation)

Imperial Chemicals Industries Ltd., Plant Protection Limited (Subsidiary) Bolton House 61, Curzon Street, London W. 1, England
M-9.

Inland Chemical Corporation, 415 Lexington Avenue, New York 17, New York
A-10, A-11.

Kilgore Chemicals, Inc. (see Motamco Inc.)

Kolker Chemical Corporation, 600 Doremus Avenue, Newark 5, New Jersey
F-19, R-9, R-10, R-11.

Larvacide Products, Inc., (see Morton Chemical Co.)

Lebanon Chemical Corporation, P.O. Box 532, Lebanon, Pennsylvania
D-1.

McLaughlin Gormley King Company, Inc., 1715 Fifth Street, S.E., Minneapolis 14, Minnesota
A-8, B-4, B-5, B-8, R-12, R-18, R-19.

Magnus, Mabee and Reynard, Inc., 16 Desbrouses St., New York 13, New York
Q-1.

Merck and Co., Inc., Rahway, New Jersey
B-3.

Michigan Chemical Corporation, Saint Louis, Michigan
F-19, F-20.

Monsanto Chemical Company, Organic Chemicals Division, 800 North Lindberg Boulevard, St. Louis 66, Missouri
F-13, F-32, M-3, P-18, P-20, P-43, P-44, P-45, P-49, P-79, R-9, R-10, R-11.

Montrose Chemical Company, 100 Lister Avenue, Newark 5, New Jersey, Also affiliate Montrose Chemical Corporation of California
D-1, F-13, P-51, R-2, R-9, R-11, R-14, R-15, R-16.

Morton Chemical Company (Panogen Company Division) (Includes Former Larvacide Products Inc.) 110 North Wacker Drive, Chicago 6, Illinois
F-14.

Motamco, Inc., 89 Terminal Avenue, Clark, New Jersey (Includes former Kilgore Chemicals Inc.)
A-10, A-11, R-7.

Murphy Chemical Company, Ltd., Wheathampstead, St. Albans, Herts, England
S-1, S-3.

Naugatuck Chemical, Bethany 15, Connecticut
S-10.

Niagara Chemical Division (See Food Machinery and Chemical Corporation)

Norda Essential Oil and Chemical Co., 601 W. 26th Streets, New York, New York
A-4, A-5, D-51, Q-1.

Olin Mathieson Chemical Corporation, Insecticide Products Department, Chemical Division, 10 Light St., Baltimore 3, Maryland (Includes former John Powell and Co. Inc.)
B-2, C-1, D-1, F-2, F-11, F-24, F-25, F-32.

Panogen Company (See Morton Chemical Co.)

Penick, S. B., and Company, 100 Church Street, New York 8, New York
A-3, A-7, B-1, B-3, B-4, Q-1.

Pennsalt Chemicals Corporation, Washington Division, 2901 Taylor Way, Tacoma, Washington
C-1, D-1.

Pest Control, Ltd. (see Fisons Pest Control Ltd.)

Pittsburgh Plate Glass Company
Columbia-Southern Chemical Corporation (subsidiary), One Gateway Center, Pittsburgh 22, Pennsylvania
C-1.

Plant Protection Ltd. (See Imperial Chemicals Industries Limited)

Plastic and Coal Chemical (see Allied Chemical Corporation)

Rohm and Haas Company, 222 W. Washington Square, Philadelphia 5, Pennsylvania
D-2, D-3, D-9, D-12, D-16, D-17, D-19, N-5, S-11, T-1, T-2, T-3, X-6.

Shell Chemical Company, 110 W. 51st Street, New York 20, New York (includes former Julius Hyman Company)
C-3, C-7, C-8, C-9, C-10, C-12, C-13, C-15, F-7, F-17, P-52, P-53, P-54, P-55, P-56.

Sherwin-Williams Co., The, 101 Prospect Avenue N.W., Cleveland 1, Ohio
D-14.

Shulton, Inc., 697 Route 46, Clifton, New Jersey
A-4, A-5, A-6, Q-1.

Solvay Process Division (see Allied Chemical Corporation)

Standard Agricultural Chemicals, Inc., Hoboken, New Jersey
N-1, N-2.

Stauffer Chemical Company, Agricultural Research Laboratory, P.O. Box 757, Mountain View, California (includes Victor Chemical Works, see Victor)
C-1, D-1, F-1, F-5, F-30, F-31, P-39, P-40, S-4.

Tobacco By-Products and Chemical Corporation (see Diamond Alkali Company)

Trubek Laboratories, East Rutherford, New Jersey
Q-3, Q-4, Q-5.

Union Carbide and Carbon Corporation (see Union Carbide Corporation)

Union Carbide Corporation, Union Carbide Chemicals Company (Division), 30 East Forty-Second Street, New York 17, New York
B-6, F-3, F-24, M-8, R-1, R-2, R-4, R-5, R-6, R-8, R-14, Q-4, X-5.

Union Chemical and Materials Corporation, Frontier Chemical Company (Division). Municipal Airport, Terminal Building, P.O. Box 545, Wichita 1, Kansas
C-1, F-1, F-33.

U. S. Industrial Chemicals, 99 Park Avenue, New York 16, New York
A-1, A-2, R-7.

Velsicol Chemical Corporation, 330 East Grand Avenue, Chicago 11, Illinois
C-3, C-4, C-10, P-18, P-20.

Vero Beach Laboratories, Inc., Box 1927, Vero Beach, Florida, (Subsidiary of Farbenfabriken Bayer)
H-7, N-6, P-16, P-34, P-37, P-64.

Victor Chemical Works, 155 North Wacker Drive, Chicago 6, Illinois (Division of Stauffer Chemical Co.)
P-18, P-43, P-45.

Virginia-Carolina Chemical Corporation, Chemicals Division, Richmond, Virginia
P-27.

Westvaco Chlor-Alkali Division (See Food Machinery and Chemical Corporation)

History of Entomology at The University of Maryland

By THEO. L. BISSELL[1]

Associate Entomologist, University of Maryland, College Park

THE FIRST 30 YEARS

ENTOMOLOGY HAS BEEN TAUGHT AT THE University of Maryland from the beginning of the Maryland Agricultural College, fore-runner of the University at College Park. The First Circular or catalogue, dated July, 1859, lists five faculty positions, including the unfilled position—"Professor of Botany, Entymology (*sic*), and Ornithology." This chair was filled by Townsend Glover who was listed in the Second Circular, issued in 1860, as "Entomologist for the United States, Professor of Natural History, Botany and Pomology." A letter written to his former superior in Washington (Patent Office, 1860) concerning an inquiry from Florida on the "hangworm" shows that Glover was present at the College in December, 1859.

Glover was the first entomologist of the United States government, starting in 1854 in the Bureau of Agriculture, then a branch of the Patent Office. Earlier he had made some 2,000 models of fruits which had won an award from the New York Horticultural Society and which were taken to Maryland to be featured in the college catalogues as a teaching aid.

While at Maryland, Glover wrote an illustrated *Journal or Field Book* to help his students identify the insects they collected. This grew into the *Manuscript Notes from My Journal* published in 1874. In spare time he made etchings of insects on copper plates, some of which were later published in his *Illustrations of North American Entomology.*

On his collecting trips about the College fields and woods Glover was accompanied by a child, Salome Lavinia Johns, daughter of Montgomery Johns, M.D., Professor of Agriculture, Chemistry, etc. Miss Johns later married Daniel C. Hopper and was the "adopted daughter" referred to by Dodge, Glover's biographer. Glover gave the Hoppers their home in Baltimore and spent his years of retirement with them. The facts in this paragraph were told the writer in April, 1959 by Anna Perkins Hopper Evans (Mrs. James H. Evans) of Wellesley Hills, Massachusetts, whose mother was Salome J. Hopper. Mrs. Evans knew Glover's widow, who lived with the Hoppers until her death.

In April, 1863 Glover returned to the Federal Government as Entomologist, although his name was carried in the College catalogues as late as 1865. Some of his reports published by the Commissioner of Agriculture, for example, 1872, 1875, and 1876 contain notes on insects collected at the College. Glover's life is covered in the biography by Charles R. Dodge (1888).

Entomology was included as a sophomore subject in the Maryland Agricultural College catalogues from 1872 to 1874. The teacher may have been R. Douglas Williams, Professor of Chemistry and Natural Sciences, or E. J. Henkle, Professor of Natural History, Anatomy, Physiology and Hygiene.

From 1876 to 1879 zoology took the place of entomology as a subject in the Natural Sciences division. Nicholson's text-book was used. In 1880 and 1881 the curriculum was again changed to include beekeeping with zoology. Zoology was taught in the sophomore year and "the raising of swine, sheep, poultry and bees" was a subject for seniors. The teacher was Dr. A. Grabowskii, from the Weisbaden Academy of Agriculture. Text-books listed: Wilson and Edinburg's *Elements of Zoology* and Quimby's *Beekeeping.*

The catalogues of 1887 and later drew attention to the need for "protection of crops from injury by insects or parasites." Entomology was then a subject for the junior year. The teacher was presumably Thos. N. Conrad, Professor of Agriculture. Prof. Charles Valentine Riley, Entomologist for the United States Department of Agriculture, was a lecturer for two years, 1886 and 1887. In 1890 Dice McLaren is listed as Professor of Natural History.

THE 1890's

The 1890's put entomology at Maryland on a sound basis, with the beginning of research and regulatory work. The Maryland Agricultural Experiment Station had opened in 1888 as an adjunct to the College. Thos. L. Brunk, Horticulturist, in 1891 gave a report on spraying apples, listing 14 insect species. In 1892 Edwin W. Doran, Professor of Zoology at the College, published the first Experiment Station bulletin from Maryland (No. 16) pertaining to insects, "Insects Injurious to the Grain of Wheat," which contains original observations on a number of storage pests. Doran later taught biology in Illinois and in Louisiana.

In 1893 C. V. Riley of the Department of Agriculture began a cooperative arrangement with the Maryland Agricultural College and Experiment Station. He answered inquiries from Washington while his assistant, Richard Swann Lull, conducted work at College Park. In June, 1894 Riley resigned from the Department of Agriculture and gave full time to the work at Maryland; however his career was cut short by his accidental death in September, 1895. Dr. Riley was a founder and the first President of the American Association of Economic Entomologists.

Two bulletins were issued from Maryland by Riley—No. 23, *Injurious Insects of Maryland*, and No. 32, *The San Jose Scale.* Mr. Lull assisted in the first, contributing on 3 tobacco insects. Riley also started a reference collection of insects. Lull later worked at Massachusetts State College, and at Yale, where he turned to paleontology. An account of Riley was published by his successor, Johnson, in Station Bulletin 57.

The year 1894 was of great significance entomologically as it marked the discovery of the San Jose scale in Maryland and other eastern states. Experience in California had shown it to be a very serious orchard pest and it spread over the State of Maryland by 1898. Apple, peach, and other fruit trees in all sections succumbed to its attack.

The coming of the San Jose scale hastened the passage of the Maryland Tree and Nursery Stock Law (April 2, 1896, strengthened by further legislation in 1898) and the formation of the State Horticultural Department. Under this law was established the position of State Entomologist. The first incumbent was Willis Grant Johnson, a native of Ohio, who had the degree of Master of Arts from Stanford University and had worked at the University of Illinois. Thus regulatory work began. Johnson also became professor of Entomology for the College, and Entomologist for the Station.

WILLIS G. JOHNSON AND THE SAN JOSE SCALE

Johnson conducted a vigorous campaign against the San Jose Scale, emphasizing early recognition and destruction of infested trees, and inspection of nurseries to prevent sale of infested stock. He conducted experiments with spray materials and fumigants, both in orchards and nurseries.

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[1] Material for this history has been drawn from the catalogues, reports and bulletins of the University of Maryland and its divisions; manuscript reports of the State Horticultural Department and Entomology Extension work; U. S. government reports and reports of horticultural societies and various entomological journals. Some of the publications from outside the University are cited. Thanks are due to many associates for help in this work, and especially to Ernest Cory for his continuous encouragement.

Fig. 1. Willis G. Johnson in his private laboratory in Morrill Hall, 1899.

The fumigation of trees was spectacular but hardly practical. Starting with heavy canvas tents as used on citrus in the West, Johnson and one of the progressive growers, Capt. Robert Emory of Kent County, turned to paper covered boxes (1899), and devised a rig for placing the boxes over the trees. A system of fumigating nursery stock in houses was also developed.

Through wide publicity, Johnson obtained grower cooperation. A full report on the scale (Station Bull. 57) was published in 1898. The pest had killed 50,343 trees, about one-third of the number in 95 infested orchards, as well as a large amount of nursery stock. Johnson left a number of pictures of ruined orchards in several parts of the State. Years later (Tenth Extension Service Report, 1924) horticulturists at Maryland called the San Jose scale a "blessing in disguise, for it necessitated that the grower give better attention to his trees, and caused the development of orchard spray practice which served to control other pests and diseases in addition to the scale." But the orchardists of the 1890's apparently bore severe losses.

Johnson contributed to the programs of the Peninsula Horticultural Society which, since 1886, has followed the fruit and vegetable problems of the Delmarva peninsula. He took a leading part in organizing the Maryland State Horticultural Society, which first met in Baltimore in 1898, and served as the first secretary-treasurer and editor. For some years the report of the annual meeting carried a report of the State Entomologist and an account of the important insects of the year, relating to fruit and other crops as well. The fruit growers repeatedly expressed appreciation of the efforts of both the State Entomologist and State Plant Pathologist in protecting their industry.

In 1899 Johnson reported that a grower in St. Mary's County lost four-fifths of his 600 acre crop of canning peas from pea aphid, then a new pest, and that the loss in the East was $3,000,000. The next year, by Johnson's direction, the peas in St. Mary's County were planted in rows and various control methods were tested. Best results followed the use of brush and cultivator, knocking aphids from the plants with pine branches and burying them with cultivators. Forty men were employed, working over the planting every 3 days. One hundred acres of peas were sprayed, using hand-powered spray pumps mounted on wagons, but this proved too expensive for the results obtained. Johnson reported (1900) saving 600 acres of peas by the brush method.

Probably on Johnson's order, the College procured four splendid *clastique* insect models made by Dr. Theodore Louis Jerome Auzoux in France. A photograph made in 1900 shows Johnson with a class of students, including T. B. Symons, using the models. The class was in Morrill Hall, then a new building. The models represent the silkworm, male and silkworm moths, and *Melolontha vulgaris* (L.), a common scarab beetle of Europe. They have been used in teaching continuously and were refurbished in 1954 and 1956 by museum technicians. The 1903 picture included here shows one of the models.

Willis Johnson left Maryland February 1, 1901, and according to H. P. Gould (1900), went to work on the editorial staff of the *American Agriculturist* in New York.

Johnson's assistants included E. Dwight Sanderson who published on sweet potato insects, then left Maryland for the Delaware Agricultural College; Harris P. Gould, who later went into pomology with the U. S. Department of Agriculture; Franklin Sherman, Jr., who left Maryland to become State Entomologist of North Carolina; and Thomas B. Symons. Dr. Symons remembers Johnson as an inspiring teacher, a forceful administrator, and an enthusiastic publicist.

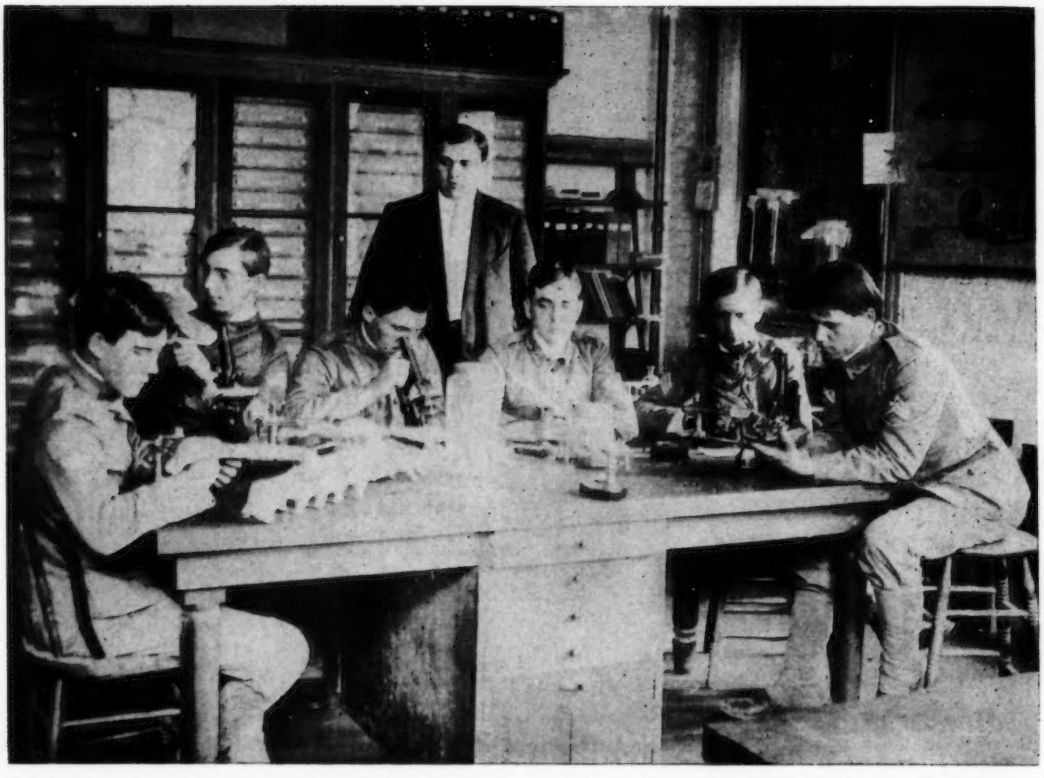

Fig. 2. Thomas B. Symons with his first class in entomology, 1903. **Left to right:** Thornton Deaner, E. R. Sasscer, R. D. Nicholls, T. B. Symons, S. B. Shaw, J. G. Ensor and D. E. Brown.

A contemporary of Johnson's at Maryland Agricultural College was Martin P. Scott, Professor of Natural History and later Professor of Biology. A College announcement of short winter courses in Agriculture to begin January 1896 lists Dr. Scott as giving five lectures in economic entomology. This was the winter before Johnson's arrival.

The first mention of Entomology as a Department in the College catalogues seems to be in the one for 1897–98. Then for 20 years there was the Department of Entomology and Zoology, after which the two became separate —Entomology in the College of Agriculture, and Zoology in the College of Arts and Sciences. For several years in the early 20's it was called the Department of Entomology and Bee Culture.

The Twentieth Century

Succeeding Johnson for a short period was Harris P. Gould, Acting State Entomologist from February to July, 1901. He issued State Horticultural Department Circular 29, *A plain talk with those who have San Jose scale to combat*. Gould collaborated with Johnson and C. O. Townsend in several Experiment Station bulletins mainly from the viewpoint of the pomologist.

The second State Entomologist was A. L. Quaintance, appointed in June 1901. He also held the title of Entomologist and Associate Horticulturist in the Experiment Station. Quaintance had come from study and work in Florida and Georgia and was a thorough scientist. He conducted the regulatory and biological work on the San Jose scale (1,336,731 trees inspected for scale in 1902) and published an account of the 1902 outbreak of the periodical cicada in Maryland, Bulletin 87. Quaintance published several short papers on Maryland entomology in the Proceedings of the Association of Economic Entomology, and in the Maryland State Horticultural Society Reports. His assistants were Ralph S. Smith, who later went to Georgia, and T. B. Symons.

Dr. Quaintance used local inspectors in the orchard surveys and in helping the fruit growers with their insect problems. Ten "Kerowater" pumps, which produced a mixture of kerosene and water, were used in 1901 in demonstrating scale control through sprays. In 1902 Quaintance introduced to Maryland the lime, salt and sulphur wash for San Jose scale. He left the State March 1, 1903 to head the work on fruit insect investigations in the Bureau of Entomology, U.S.D.A.

The Department of Entomology Under Symons[2]

Thomas Baddeley Symons, native of Talbot County, came to Maryland Agricultural College to study general agriculture in 1898, but became interested in entomology under Willis Johnson. In 1900 Johnson and Symons made a tour of the orchards in western Maryland, photographing orchards and surveying damage by San Jose scale. Washington County then had 820,000 peach trees, Kent County on the Eastern Shore had 480,000, eight times as many as now in the two counties. There were "fruit trees everywhere," recalls Symons, but San Jose scale, yellows disease and neglect cut the numbers drastically. Symons graduated in entomology in 1902 and was appointed As-

[2] This section is augmented with personal recollections given the author by Dr. Symons in March 1953, three years after his retirement as Director of Extension. His enthusiasm and broad grasp of forces and trends are always an inspiration.

sistant Entomologist under Quaintance. He had studied a summer at Cornell and taught in his senior year at Maryland. He secured his Master's degree under Quaintance, with work on San Jose scale biology, then visited nurseries in France and England. In 1905 he became State Entomologist (after 2 years as Acting State Entomologist) and taught zoology and entomology.

The 1902 report of the Horticultural Society contains a spray calendar for fruits and vegetables by F. H. Blodgett, plant pathologist, and T. B. Symons. It has an interesting form—pest control practices for each month of the year.

Homemade lime sulfur for scale control was developed and widely demonstrated in the first decade of the 20th century. The material was boiled in wood and metal troughs designed from the hog-scalding trough used in Talbot County, Symons's native county. Demonstrations were held even with snow on the ground. Manufacture of lime sulfur gradually left the farm and became a commercial process. Dr. Symons's assistants were F. C. Bishopp, A. B. Gahan, G. P. Weldon, L. M. Peairs, and E. N. Cory.

Dr. Symons recalls the many orchard expansions during the decade. For many years he was Secretary-Treasurer of the Maryland State Horticultural Society. This organization then held its annual meetings in Baltimore and staged large exhibits of fruits, flowers, vegetables, machines and sometimes entomological specimens. These exhibits held year after year stimulated interest in growing better produce.

The State Horticultural Department administered by T. B. Symons, State Entomologist, and J. B. S. Norton, State Plant Pathologist, was a real force in the progress of Maryland Agricultural College in a critical period. There were strong enemies of the College who tried to reduce its support. But "State Hort" had money for travel, was able to show the value of scientific agriculture, and made many friends for the College in all areas of the State. Dr. Symons was a charter member of the Entomological Society of America.

T. B. Symons's Assistants

Fred C. Bishopp, who had come from Colorado, worked at Maryland 3 months in the winter of 1903. He found Maryland a busy place with nursery inspection, teaching, and fruit judging all demanding attention at once. He left for employment with the U. S. Bureau of Entomology, where he advanced rapidly. He was elected an Honorary Member of the Entomological Society of America in 1959.

Arthur B. Gahan came to Maryland from Kansas State College in 1904 and served until 1915. One of his first jobs (noted in Bulletin 101) was the preparation of 30 exhibition cases with insects and examples of injuries to crops. The principal work was the inspection of nurseries for San Jose scale and the condemnation of infested stock. Some nurserymen did not take these losses calmly and the inspectors were not always welcome—but the work was carried through. Mr. Gahan recalls the San Jose scale as the "big bug-a-boo."

Mr. Gahan also taught entomology. Two of his pupils were Ernest Ralph Sasscer, and Ernest Neal Cory.

In 1906 Symons, Coffin and Gahan published on the mosquitoes of Maryland. T. Homer Coffin, who was on the Johns Hopkins University staff, and Gahan made a survey of mosquitoes and their breeding places around the city of Baltimore.

In 1909 Gahan was assigned to research with the Experiment Station. Two bulletins resulted from this work, one on greenhouse insects and one on the Aphidiinae of North America. From the latter, Maryland bulletin 152, grew his life work, the taxonomy of certain parasitic Hymenoptera. This bulletin came to the attention of F. M. Webster, in charge of the U. S. Bureau of Entomology's Division of Cereal and Forage Crop Insects, and in 1913 he engaged Gahan to identify parasites, particularly those of the greenbug. For two years, working space was provided on the Maryland campus; then Gahan moved to Washington.

George P. Weldon was an assistant at Maryland in 1906 and 1907, working on San Jose scale control. He had a part in tree fumigation and dipping experiments. Mr. Weldon left Maryland for California.

Leonard M. Peairs, also from Kansas, was at Maryland from 1908 to 1910. In Bulletin 131 he is credited with superintending experiments on fumigation and nursery stock dipping. In 1909 a study of the San Jose scale on osage orange hedges by Symons and Peairs, showed that the hedges were a nuisance to the orchard industry. Peairs left Maryland for West Virginia where he distinguished himself as teacher, author, and as editor of the Journal of Economic Entomology. He was elected an Honorary Member of the Entomological Society of America in 1954.

Orville G. Babcock worked in entomology for 2 years—1910 to 1912. He had a part in lime sulfur spray tests for San Jose scale and terrapin scale, and also assisted in teaching. Mr. Babcock some years later was employed by the United States Department of Agriculture on animal insect parasites.

Ernest N. Cory was appointed as assistant entomologist in 1909, the year he was graduated from Maryland Agricultural College. From then until 1914 he taught entomology, inspected orchards, and had a part in a number of Experiment Station bulletins with T. B. Symons and other associates. These bulletins included work on codling moth, San Jose and terrapin scales, flies and insects on fruit, shade trees and vegetables. Cory was senior author of Bulletin 176 on peach tree borer.

Students in this period, 1909–1914, whom Ernest Cory assisted in teaching were William H. White, Allen B. Duckett, F. X. (Tom) O'Neill, Reginald V. Truitt and Max Kisliuk, Jr.

An Important Event of the Second Decade

Passage of the Smith Lever Act by Congress in 1914 established the Agricultural Extension Service with cooperative work between Nation, State, and County. Some Maryland counties already had agricultural agents; soon after 1914 all counties were supplied with county agents and home demonstration agents. T. B. Symons was appointed to head this work in Maryland; thus his efforts were expanded to cover the whole field of Agriculture.

Dr. Symons stated in 1915 (First Maryland Extension Service Report) that the first regular pruning and spraying demonstrations in Maryland were held in 1903. The Experiment Station Report for 1902–03 had said "the work of the Entomologist in the control of insects, particularly the scale, is—a very valuable aid to orchardists, and will enable them to save and protect thousands of dollars now invested in this industry. . . ." The report spoke of "verification and demonstration experiments." The Smith-Lever Act put the dissemination of information, or extension work, on an equal basis with teaching and research.

The Succession of Ernest N. Cory

When Symons became Director of Extension, Cory succeeded to the positions of Head of the Department of Entomology and Zoology, and State Entomologist. Thus began in 1914 a career of progressive service that ran for 42 years. Dr. Cory inherited several old problems, such as San Jose scale and nursery inspection, and assumed many new problems with the introduction of new pests, and with the growing public consciousness of the importance of all insects.

The house fly, greenhouse and ornamental pests, hessian fly, and fruit insects were the main items that received attention from 1911 to 1920. With the cooperation of the United States Department of Agriculture, Cory demonstrated a system of trapping house fly maggots from stable manure; a Maryland student, Max Kisliuk, Jr., assisted in this work.

Philip Garman of Kentucky was appointed Assistant Entomologist with the Experiment Station, and published on geranium pests, *Tarsonemus pallidus* Banks and others, and on oriental fruit moth, an insect which was accidentally introduced from Japan a few years before on flowering cherry trees. Garman worked in Maryland from 1916 to 1919. Two young men from West Virginia were employed by the government in 1918 to scout the Eastern Shore for oriental fruit moth. These were Albert F. Vierheller and Joseph H. Boyd, both of whom later turned to horticulture.

In the summer of 1916 Oliver I. Snapp came to Maryland as graduate assistant, but shortly returned to Virginia to teach. At Maryland he worked on the woolly apple aphid. Another inspection and extension assistant employed about this time was O. K. Courtney.

The increased need of food in World War I stimulated the publication of the first Maryland extension bulletins on entomology, on fruit insects, hessian fly, and insects and rodents in stored products. Harold S. McConnell from South Carolina was engaged in fruit insect extension work from 1916 until he left for service with the Army Medical Corps in 1918. He returned to the University in 1924. "Mac" recalled the early meetings of the Entomological Society of Washington in Saengerbund Hall. Serious entomological discussions in several European and American accents were mixed with refreshment and fellowship at every meeting.

Teacher of beginning zoology and entomology in 1915 was J. R. Christie who later became a nematologist in government service. From 1916 to 1921, when a separate Department of Zoology was formed, these subjects were taught by Charles J. Pierson, a native of Ohio trained in Nebraska and California.

The writer's first knowledge of entomology came with Prof. Pierson's teaching. I remember especially his vivid story of the outbreak of the Rocky Mountain locust in the Plains states, which occurred during his boyhood in the 1870's. The locusts, or grasshoppers, caused great destruction so that for 2 years little could be produced on the Pierson farm.

Incidentally, in 1918 entomology was a required course for all students in Agriculture at Maryland.

R. V. Truitt was appointed Assistant Zoologist in 1919 and, under Cory's direction, began his far-reaching work with the oyster and crab industries, which was later conducted at Solomon's Island.

Succeeding Garman in the Experiment Station in 1920 was Clyde C. Hamilton, who worked for several years on ornamental plant insects, European red mite and other fruit pests. Cory and Hamilton devised a practical control, published in Bulletin 272, for boxwood leaf miner, a pest new to Maryland in 1913. Chrysanthemum gall midge was treated in Bulletin 269 and European red mite in Bulletin 264.

Clarence B. Nickels of Mississippi was a graduate student in 1919 and 1920. The writer remembers his work on the corn root aphid. Nickels was also an assistant in apiculture and peach tree borer studies.

The University of Maryland—1920

An important change at the end of this decade was the amalgamation of the College Park schools with those in Baltimore to form the present University of Maryland. In 1916 the Maryland Legislature had taken over the old Maryland Agricultural College from the stockholders and made it the Maryland State College. Then the College of Agriculture was organized and the gradual growth of the Department of Entomology continued.

Ernest Cory continued as head for another 36 years. The many problems that arose during this period centered mainly about introduced insects: Mexican bean beetle, 1924; Japanese beetle, 1926; European corn borer, 1932; green peach aphid (as a pest of tobacco) 1946; and alfalfa weevil, 1952. Mosquito control received increasing emphasis.

The advent of DDT during World War II and the many other insecticides that appeared in the following decade brought new responsibilities for the Department. Dr. Cory was on the conservative side in recommending materials that might endanger human health. His *Use and Limitations of DDT* appeared in 1946. Then as a result of his insistence, parathion was recommended to Maryland fruit growers only with strong warnings against use without full protection to operators. The only other use of parathion recommended in Cory's administration was on tobacco and vegetables by airplane application, where operators with special training are involved.

Dr. Cory took a prominent part in the National and Eastern Plant Boards, organizations aimed at nation-wide coordination of quarantine operations. He was chairman of the Eastern Plant Board in 1934, and secretary for a long period in the 40's and 50's.

Finally Ernest Cory worked for years to promote the profession of entomology on a national and international basis by leading in the activities of the American Association of Economic Entomologists. He was Secretary-Treasurer and Business Manager of the Journal of Economic Entomology from 1936 to 1953, except for the year 1947, when he was President of the Association. For his presidential address he used the topic, "Totalitarian Insects." He worked diligently for the union of the two national entomological societies to form the present Entomological Society of America in 1953. That Society elected him an Honorary Member in 1954.

Dr. Cory retired July 31, 1956. At a congratulatory dinner given the preceeding May addresses were made by T. B. Symons, his former director, and P. D. Sanders (1957), a former worker in the Department and now for many years editor of the *Southern Planter*, Richmond, Va. On this occasion the Ernest N. Cory Scholarship fund of $3700, raised by his friends, was presented. The income from this fund is given each year to an outstanding Senior or Junior in the College of Agriculture, preferably one majoring in entomology.

Department Roster, 1922 to the Present

The many other members of the Department, 1920 to the present can only be listed with their chief contributions. Here are those who served five years or more and those who are presently members of the Department.

George S. Langford, 1922 to date. Japanese beetle, nursery inspection, shade tree and ornamental insects, flies and mosquitoes. Editor of Entoma 1943–1944. Appointed State Entomologist, 1957.

Paul D. Sanders, 1922–1930. Extension entomology, fruit insects.

Harold S. McConnell, 1916–1918 and 1924–1958. Oriental fruit moth, European corn borer surveys and parasites, taxonomy of scale insects.

Harold H. Shepard, 1925. Corn earworm. 1947 to date. Teaching: insecticides, (part-time).

Paul Knight, 1925–1943. Teaching: general entomology.

R. E. Snodgrass, 1925–1947. Teaching: insect morphology, (part-time).

Lewis P. Ditman, 1927 to date. Corn earworm, pea aphid and other canning crop insects; insecticide application, winter hardiness in insects.

George J. Abrams, 1927 to date. Apiculture and teaching; extension, bee disease control. Organizer of Eastern Apicultural Society, 1955.

Castillo Graham, 1928 to date. Extension entomology, fruit insects, Cumberland-Shenandoah fruit workers conference.

Samuel L. Crosthwait, 1931–38. Vegetable insects, mosquitoes.

Engel L. R. Gilbert, 1934–1951 (intermittent). Japanese beetle, cattle lice.

J. Franklin Yeager, 1936–1946. Teaching: insect physiology (part-time).

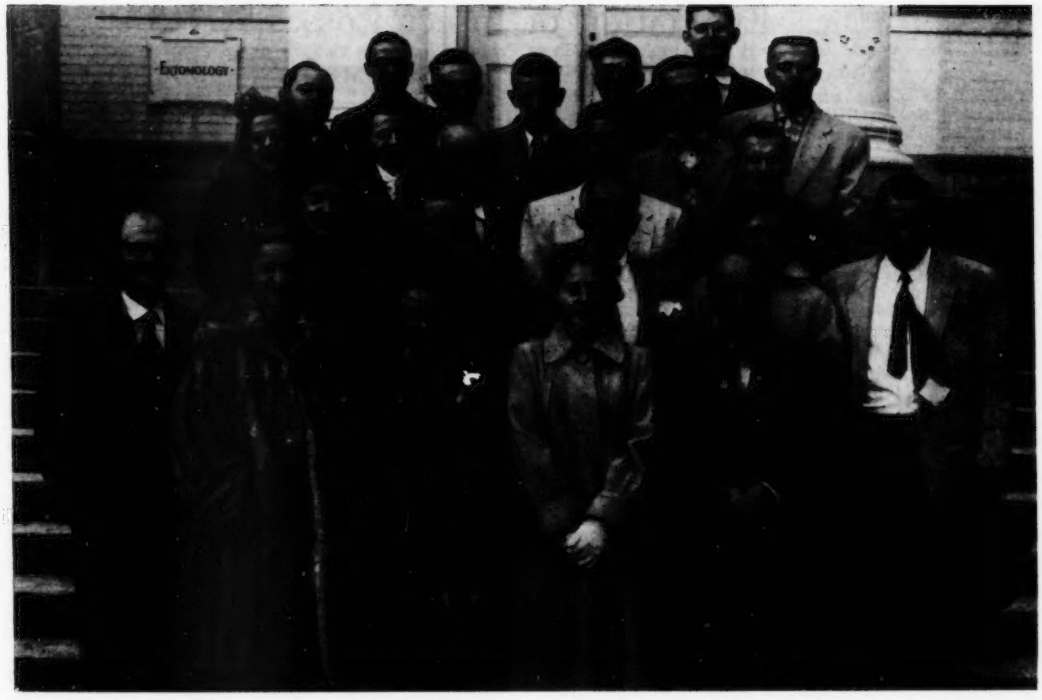

Fig. 3. Entomology staff and students, 1956. **First row, left to right:** T. L. Bissell, Ernestine Thurman, Helen Bewley, Alice Stawinski, George Abrams. **Second row:** Lillian Barrow, Elizabeth Haviland, E. N. Cory, Oris Treadwell, L. P. Ditman. **Third row:** Blanca d'Leon, Mary Ahalt, H. S. McConnell, F. P. Harrison, W. C. Harding, Jr. **Back row:** W. T. Johnson, B. R. Evans, G. S. Langford, W. E. Bickley, D. G. Kissinger, H. A. Highland, J. R. Foster, J. A. Davidson.

RUFUS H. VINCENT, 1937–1942. Mosquitoes, Japanese beetle milky white disease.

JULIAN J. CHISOLM, 1938–1948. Photography.

WILLIAM E. BICKLEY, 1940–41 and 1949 to date. Teaching: taxonomy, medical entomology, graduate direction; mosquitoes. Head of Department since 1957.

ELIZABETH E. HAVILAND, 1943 to date. Teaching: general entomology, morphology, greenhouse insects, animal parasites.

THEODORE L. BISSELL, 1947 to date. Extension entomology, insects of hay crops, exhibits. Maryland Insect Notes.

SAMUEL C. MUNSON, 1947-1958. Teaching: physiology (part-time).

JAMES R. FOSTER, 1948 to date. European corn borer, Japanese beetle, mosquitoes. Photography.

REECE I. SAILER, 1951 to date. Teaching: ecology (part-time).

WALLACE C. HARDING, JR., 1951 to date. Japanese beetle, survey entomology, insects of ornamentals.

WARREN T. JOHNSON, 1952 to date. Nursery inspection, chestnut insects, pests of ornamentals and livestock insects. Teaching: regulatory entomology.

ELROY R. KRESTENSEN, 1955 to date. Fruit insects.

FLOYD P. HARRISON, 1955 to date. Teaching: horticultural and field crop insects. Research on vegetable insects.

STANLEY R. JOSEPH, 1956 to date. Mosquito Control.

E. ELWOOD LYNCH, 1956 to date. Mosquito Control.

JOSEPH THOMAS WHITLAW, 1956 to date. Insecticide Residues.

CHARLES W. MCCOMB, 1957 to date. Nursery inspection, insects of ornamentals.

JACK COLVARD JONES, 1958 to date. Teaching: physiology.

ALLEN L. STEINHAUER, 1958 to date. Research on forage crop insects.

LESTER F. GEORGE, 1958 to date. Mosquito Control.

LAWRENCE W. SMITH, JR., 1958 to date. Mosquito Control.

ROBERT A. BERRY, JR., 1959 to date. Mosquito Control.

JERRY MALLACK, 1959 to date. Mosquito Control.

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Evaluation of Insect Losses

THE ALFALFA WEEVIL: AN EXAMPLE[1]

By ELLSWORTH HASTINGS

Montana State College, Bozeman

ONE OF THE MOST IMPORTANT AND PERPLEXING PROBLEMS facing the economic entomologist of today is that of evaluating control efforts critically. Without adequate data on insect populations and their natural fluctuations along with a knowledge of damage potentials, it is impossible for the entomologist to provide the informed advice and leadership which is expected of him.

There are many species of insects concerning which recommendations are being made without the knowledge necessary to advise intelligently either for or against control efforts. The problem of the alfalfa weevil, *Hypera postica* (Gyll.), an introduced pest which is becoming of increasing importance in the United States, may be used as an example of the need for and lack of such knowledge. The ever changing distribution patterns, the variations in biology and population density, and the resulting unknown damage potentials of the alfalfa weevil are all too familiar unknowns applicable to so many of our insect species. Rangeland grasshoppers, aphids, cutworms, wireworms, animal pests, etc., all present problems which are in many respects parallel to those of the alfalfa weevil.

Since reasonably adequate measures are available now for combating many insect pests, millions of dollars are expended annually in control activities. In view of these expenditures, the lack of data on actual losses by varying degrees of insect infestations is rather surprising. There are probably several contributing factors which, in part, may account for this lack of information.

Many of the problems encountered in measuring the damage done by the weevil are no different from those involved in evaluating damage from other insect pests. The studies are both complicated and time consuming. This fact, plus the real or imagined pressure on workers to find an immediate control may explain why adequate data on damage evaluation lag so far behind those on control. It would appear that the rapid development of new insecticides has thus created a situation whereby control recommendations must often be made without benefit of adequate factual information on either the damage being done by the particular pest or the effects such control will have on its future generations.

It is a rare occasion when a justification of, or a recommendation for a control operation is not accompanied by some figures showing gains or losses to be expected. Much of this information can be and frequently is quite misleading in that the figures are arrived at through mere estimates of immediate losses plus speculation on future savings. Actually, this practice is so prevalent and of such long standing that there is some cause for concern, especially where it leads to control operations which may have little or no value. As long as a noninsecticide-resistant population is involved the implications are only monetary. However, if a resistant population develops as a result of these practices, the means of controlling it under conditions where it is actually causing economic damage may be lost. In many cases it might be more sensible to withstand a small amount of damage over a long period rather than none for a short period followed by a compounded problem.

The alfalfa weevil is of present concern in two widely separated areas. Included in these regions are the western states as far east as the western counties of North and South Dakota and Nebraska and the Eastern Seaboard states from Massachusetts to Georgia. It is entirely within the realm of reason to suspect that these two areas of infestation might converge at some future time.

Infestations in the western area of weevil occurrence are the result of its gradual spreading in a widening circle from the Salt Lake Valley where it became established shortly after the turn of the century. Weevils have been found in western Washington, northern Arizona, and western North Dakota, however, these states report no infestations of apparent economic importance. If the progress of this insect follows the same pattern it has in the past, it will only be a matter of time until populations in the above states are sufficient to cause economic losses. It is impossible to predict when this might occur because the rate of spread and subsequent population buildups have been quite variable through regions of the West where the weevil has become established. Consequently continuous investigations are necessary to keep abreast of the progress of this insect. Such vigilance is likewise needed with numerous other pest species such as the European corn borer, *Pyrausta nubilalis* (Hbn.) which has succeeded already in spreading over a wide geographic area.

In the western area of infestation, exclusive of Washington, Arizona, and North Dakota, in excess of 3.5 million acres of alfalfa are affected by the alfalfa weevil in varying degrees of severity. Within this acreage control measures were applied to approximately 1.4 million acres in 1958. At present Montana, Idaho and Utah each have approximately 600,000 acres of alfalfa infested by this weevil. Utah is the only western state that reports its entire alfalfa acreage as supporting economically important weevil populations. However this pest is continuing to spread within the other western states where there are approximately 10.25 million acres of alfalfa grown (Census of Agriculture 1954) most of which is a potential area of infestation.

As an economically important pest the alfalfa weevil is a newcomer in the Eastern Seaboard states as the European corn borer is in the Midwest. In approximately 8 years the weevil has spread and increased in numbers to be of economic importance to the entire alfalfa growing acreages, involving one-half million acres, in Virginia, Maryland, Delaware, and New Jersey. Workers in these states estimate that 397,000 acres were treated for weevil control during 1958. Economic infestations in Pennsylvania, New York, Massachusetts, Connecticut, North and South Carolina, and West Virginia are estimated at 290,000 acres exclusive of Pennsylvania for which no data are available. Of this acreage insecticidal control was applied to approximately 50,000 acres, again exclusive of Pennsylvania. Thus, over three-fourths million acres of alfalfa are presently infested with this insect in the Eastern Seaboard region in which approximately 2.5 million acres of alfalfa are being grown (Census of Agriculture 1954). As in the West, if the weevil continues to follow the same pattern of spread, which is quite probable, this 2.5 million acres will be subject to damage in the near future. Again entomologists are faced with the same problems of surveys and damage studies in these areas as they are in the areas of borderline infestations of European corn borer.

The results of a questionnaire sent to officials of the various states in which the weevil occurs, indicate that a great variety of situations exist relative to alfalfa damage from this insect. The estimates received varied from no

[1] Contribution from Montana State College, Agricultural Experiment Station. Paper No. 464 Journal Series.

damage at all to as much as 100 per cent destruction of the first cutting followed by a 50 per cent loss of the second. With but few exceptions the workers admitted frankly that their "guesses" did not enable them to evaluate the situation correctly. Several correspondents mentioned related problems in damage evaluations involving such insects as aphids, spittle bugs, wireworms, flea beetles, forest insects, and livestock pests. No doubt this list could be expanded to include many others.

In some regions the severity of weevil infestation varies markedly from year to year, field to field and even within individual fields. In other regions, especially on the Eastern Seaboard, such variations are less marked. Most entomologists are well aware of these variations in population numbers from time to time and place to place in the case of many of our economic insects. In view of these differences it is apparent that in evaluating damage it is impossible to generalize even within a restricted area let alone between geographic areas. In spite of this only a limited amount of work of a quantitative nature has been done to determine the economic importance of the alfalfa weevil as well as other insects under the various conditions of their occurrence.

Currently two procedures are followed in alfalfa weevil control. They are, one, to destroy the adult beetle in the early spring before egg laying has begun, and two, to apply insecticide to the foliage to kill the larvae after they have hatched. Over the area of its distribution differences exist in the biology and activities of the weevil to the extent that control in the adult stage is not universally successful.

Where weevil are controlled in the adult stage, the only basis for recommendations is the extent of visible damage from larval feeding during the previous season. When severity of infestation fluctuates from noneconomic to economic from year to year, pre-season adult control is sometimes difficult to justify without knowing the current adult population and its damage potential. We neither have a means of determining accurately preseason adult populations nor do we know their potential for damage even within the various areas of known weevil occurrence. A parallel situation exists throughout the U.S. in controlling many of our fruit pests in that preventive measures are taken without a true knowledge of what may develop during the growing season.

A number of factors must be taken into consideration in evaluating the effect of the weevil on alfalfa production. Hastings and Pepper (1953) have shown that larval activity alone will not suffice as a criterion of the extent of damage inasmuch as adult activities, either through feeding or oviposition punctures or both, can and do cause decreased yields. Damage from more than one stage of an insect is not unique in the alfalfa weevil. The plum curculio, *Conotrachelus nenuphar* (Herbst) and the boll weevil, *Anthonomus grandis* Boh., to name but two, are other examples of insects in which both the adult and the larval stages are injurious.

The damage from alfalfa weevil larval feeding is considerably more difficult to assess accurately when larval control methods are used than when the pest is controlled in the adult stage. The effect of the spray on other insects which may be either harmful or beneficial to alfalfa production must be taken into account. Pre-season adult control, at least in the western region, can be accomplished at a time when there is very little activity among the numerous other insects found in alfalfa fields. Most insecticidal control for other pests does not provide this apparent specificity and as a consequence side effects must be considered.

Hastings and Pepper (1953) showed that yield level also can be a factor in extent of damage caused by a given weevil larval population. For instance, they found that a field producing a total yield of 2.6 tons per acre on the undamaged portion suffered a 15 per cent reduction in yield whereas another field producing 5.3 tons per acre sustained a 34 per cent reduction. Larval populations were nearly identical at the time of first cutting in the untreated portions of both fields. Therefore, where diverse cultural practices with resultant differences in yield are prevalent a single loss figure for a given larval population would have little or no meaning.

The effect of the weevil on the quality of the forage both from the standpoint of nutrition and palatability must be recognized in any comprehensive evaluation study. Hastings and Pepper (1951) found a 26 per cent reduction in carotene content owing to weevil activity in one series of tests they performed. Most workers are cognizant of the importance of the quality factor in evaluating insect damage but owing to lack of data are unable to appraise it.

Where damage is obviously extensive as a result of pest activities, there is no doubt that control practices are necessary to continue growing the commodity in question. However, even under these circumstances of extreme losses from heavy populations it would be impossible with our present knowledge to evaluate damage by most insect species or benefits obtained through control on a nation-wide basis with any degree of accuracy. In addition those millions of acres of crops sustaining intermediate populations of insects, the damage from which little or nothing is known, are extremely important to the problem. In fact, it could be postulated that when considering the national problem of insect losses the total effects of intermediate insect populations might be equal to or greater than those effects from obviously heavy populations. Before any formalized tabulation on a nation-wide basis of damage from various insect species can have any real meaning, detailed local studies must be forthcoming. This information will likewise serve as a basis for a much more intelligent and informed approach to insect control.

Summary

A real need exists in the field of Entomology for reliable data on insect losses both from the standpoint of evaluating our national problem and of providing information for intelligent advice in recommending control practices. "Guesses," intelligent or otherwise, cannot be relied upon to provide a basis for action.

To obtain the necessary information a number of problems arise a few of which can be pointed out in the problem of evaluating alfalfa weevil damage.

In the United States control measures were applied on 1.8 million acres in 1958 for just the alfalfa weevil. This pest is continuing to extend its geographic range as are others such as the European corn borer.

A great variety of situations exist relative to damage from the weevil as is the case with many other insects such as aphids, spittle bugs, wireworms, flea beetles, forest insects, livestock pests, etc. As a result generalizations cannot be expected to apply.

Methods are needed to determine pre-season populations and damage potentials for such insects as the weevil and certain fruit pests when preventive control measures must be used.

Damage from both the adult and larval stages of certain curculionid pests, including the alfalfa weevil, boll weevil, etc., complicate damage evaluation.

Cultural practices, yield level, and quality reduction are factors which likewise must be considered in evaluating damage.

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COTTON INSECT RESEARCH AT TALLULAH, LOUISIANA

By R. C. GAINES

U. S. Department of Agriculture, Agricultural Research Administration, Bureau of Entomology and Plant Quarantine

The Tallulah laboratory, often called the Delta Laboratory, Southern Field Crop Insect Investigations, Bureau of Entomology, U. S. Department of Agriculture, was established on July 1, 1909, or thereabouts, with R. A. Cushman in charge. He remained in charge until November 1910 and was succeeded by G. D. Smith, who held the position until the spring of 1915, at which time he was succeeded by B. R. Coad. The cotton insect investigations at Tallulah were in the Division of Southern Field Crop Insect Investigations and were directed by W. D. Hunter from 1909 to 1925. Shortly after Dr. Hunter's death on October 13, 1925, the Division of Cotton Insect Investigations was created with B. R. Coad in charge. Headquarters for the Division was at Tallulah. L. O. Howard was Chief of the Bureau of Entomology when the laboratory was established. B. R. Coad remained in charge of the Division of Cotton Insect Investigations until January 27, 1931, and was succeeded by F. C. Bishopp. Dr. Bishopp remained in charge until June 20, 1931, at which time he was succeeded by R. W. Harned. The division headquarters was moved from Tallulah to Washington, D. C., in January 1931 and the writer was placed in charge of the laboratory at Tallulah.

In the early days, the work was confined mostly to the life history, habits, and control of the boll weevil. Most of the insecticide studies against the boll weevil were with lead arsenate for several years after the establishment of the laboratory. In about 1916, calcium arsenate was first used against the boll weevil and was found to be more effective than any other poison heretofore used. In experiments conducted in 1916 and 1917, increased yields in fields dusted with calcium arsenate were so outstanding that in 1918, 35,000 acres were dusted under Bureau of Entomology supervision. The satisfactory results obtained from the use of calcium arsenate were reported to such an extent that manufacturers became interested and produced about 3 million pounds in 1919, 10 million pounds in 1920, and 60 to 70 million pounds have been manufactured annually during recent years. During early experimentation, calcium arsenate was in a very crude state; and credit goes to chemists at the Tallulah laboratory for the stabilization of its physical and chemical properties which, of course, had to be worked out and developed. In recent years, chemists have produced calcium arsenates with varying percentages of water soluble arsenic and calcium arsenates containing no free lime; however, none of these new products to date show promise of replacing regular calcium arsenate. Along with the development of calcium arsenate, field experiments were conducted at Tallulah and in many areas throughout the cotton belt to determine the poundage and intervals between applications, which would give the most economic returns.

With the development of calcium arsenate, it was necessary to develop adequate machines for making applications to cotton. With the cooperation and aid of the Bureau of Public Roads, engineers stationed at Tallulah developed various types of dusting machines, which are now in use and include such general types as the rotary-type hand gun which will take care of the dusting at 4- or 5-day intervals of 8 acres of cotton; the two-nozzle saddle gun, 40 to 50 acres; the two-nozzle traction machine, 40 to 60 acres; the three- to five-nozzle traction machine, 75 to 150 acres; power operated machines, 200 to 300 acres; and tractor operated machines, still larger acreages. In 1922, in cooperation with the United States Air Service, the first experiments were conducted where calcium arsenate was applied from airplanes to cotton plants for cotton insect control. With the cooperation of the engineers, suitable equipment for the successful application of calcium arsenate to cotton was developed. As a result of that early experimentation, there are today hundreds of airplanes throughout the cotton belt which are equipped for dusting cotton and other crops.

Since 1909, hundreds of proposed remedies for boll weevil control have been tested at Tallulah. In addition, many different types of boll weevil catching and square collecting devices and machines have been tested. Over the period of years, calcium arsenate has continued to hold first place in effectiveness.

Some of the other phases of boll weevil work have included cage hibernation studies, examinations of Spanish moss, and later ground trash to determine the number surviving the winter in nature, examinations of cotton plants in May and June for overwintered weevils, a study of movement with flight screens, longevity, chemotropic, parasite and other studies. The parasite studies have not only included much work on native parasites, but have included introductions and liberations of foreign parasites, particularly *Triaspis vestiticida* and *Microbracon vestiticida*.

With the general use of calcium arsenate, boll weevil control in recent years became complicated by cotton aphid infestations which followed. The destructive aphid infestations were brought about largely by the killing off of predators and parasites which upset the normal balance in nature and resulted in a very material increase in cotton aphid populations. In recent years, in cooperation with State Experiment Stations, boll weevil control recommendations have been modified to include the control of the two insects, the cotton boll weevil and the cotton aphid. This is accomplished by the addition of 2 percent of nicotine to alternate applications of calcium arsenate, or 1 percent of nicotine in all applications. Considerable time also has been devoted to the control of leafworms and insects associated with cotton fleahopper damage. Some work has also been done against thrips, crickets, and other miscellaneous insects.

In field plots at Tallulah, calcium arsenate dust at either 4- or 5-day intervals for weevil control annually during the past 27 years gave an average increase over untreated of 314 pounds of seed cotton per acre, or 22.5 percent. During the past 8 years, calcium arsenate gave an increase over untreated of 154 pounds of seed cotton per acre, or 10.1 percent compared with 378 pounds, or 24.8 percent, where both weevils and aphids were controlled with calcium arsenate plus nicotine. These figures show the importance of the cotton aphid control.

While exact figures are not available on the amount of calcium arsenate used on cotton, a large proportion of the calcium arsenate manufactured is used on cotton, and it is estimated that the 2 million or more acres dusted annually for boll weevil control increases the grower's profit by many times the total of $3,500,000 spent by the United States Department of Agriculture on boll weevil research since the work was started in 1894. The use of calcium arsenate is very profitable; however, it is by no means a perfect insecticide for control of the boll weevil. A less expensive material is needed which is more toxic as a stomach poison or that will kill by contact and one that will not cause an increase of aphids.

The foregoing gives a very brief history of the Tallulah laboratory together with a few comments on some of its problems and accomplishments, which brings us to the experimentation which is now under way. Some of the newer insecticides, one of which is benzene hexachloride, are very effective against certain cotton insects and show

considerable promise. Considerable information on benzene hexachloride was obtained in 1946, which will be presented in several papers at this meeting. The dusting qualities of some of the preparations of benzene hexachloride used in 1946 were very poor. Results indicated that the effectiveness in some cases could not be correlated with the reported gamma isomer content. Information is needed on the toxicity to cotton insects of the several isomers, alone and in combinations. Although benzene hexachloride appears to possess outstanding properties, much additional information is needed in regard to its use before recommendations are made.

Since the engineering work was discontinued in 1931, many new types of airplanes have been developed, which are now used for crop dusting. Additional research information on swath widths is needed with modern airplane dusters. Airplane spraying equipment is of comparatively recent origin and has been tested in only a very limited way against cotton insects. Concentrated sprays and possibly liquefied gas or thermal aerosols should be thoroughly tested against the boll weevil, the cotton aphid, the bollworm, the leafworm, and other insects.

The American cotton industry is facing serious competition from the increased use of synthetic fibers and increased production of foreign cotton. Apparently, the future depends on decreasing the cost of production and improving the quality of cotton, both of which can be greatly aided by better insect control. Improvements in ground dusting equipment for tractors, further improvements of airplane dusters, the development of new materials having insecticidal properties, and the new methods of applying insecticides may be the beginning of a new era in the control of the boll weevil and other cotton insects.

Note: The above was presented by Mr. Gaines as the chairman's address at the twenty-first annual meeting of the Cotton States Branch, American Association of Economic Entomologists, Biloxi, Miss., on January 14, 1947. He continued in charge of the Tallulah laboratory until July 15, 1956, at which time he was transferred to Baton Rouge, La., to head up a new laboratory established in cooperation with the Louisiana Agricultural Experiment Station to study the problems of resistance of cotton insects to insecticides. From July 16 until November 5, 1956, T. R. Pfrimmer was acting in charge of the Tallulah laboratory. Since the latter date G. L. Smith has been in charge. Thus research on the boll weevil has been conducted uninterruptedly at the Tallulah laboratory since its establishment in July 1909. Last year marked the 50th anniversary of its establishment.

C. F. RAINWATER

E.S.A. QUESTIONNAIRE REGARDING NATIONAL MEETINGS

By R. L. METCALF

E.S.A. President, 1958[1]

Recently the members of this Society were kind enough to complete a questionnaire authorized by the 1958 Governing Board to survey membership preferences regarding the National Meetings of the E.S.A. The results were summarized at the 1958 annual meeting in Salt Lake City and have been presented to the *Program Committee*. However, since a number of the questions asked are of general interest, this short summary is presented here for the information of the membership at large.

A total of 3925 questionnaire forms were mailed to the membership and 40.7% were completed and returned. The returns from the various sections of our Society were: A—34.8%, B—73.3%, C—78.7%, D—66.1%, E—24.9%, and F—56.7%.

A survey of the major entomological activity and type of employer of each member gave the following summation.

Activity		*Employer*	
Research	55.5%	State	39.8%
Teaching	6.5%	Federal	29.6%
Extension	4.0%	Industrial	21.9%
Applied control	9.0%	Endowed Institution	4.5%
Sales and/or Development	9.2%	Self	4.2%
Administration	6.9%		
Regulatory	3.1%		
Consulting	2.5%		
Student	2.5%		
Retired	0.8%		

The remainder of the questions dealt exclusively with the organization of the national meetings of the Society, and is summarized in actual numbers rather than percentages, since not every questionnaire was completely or accurately completed.

I. *Principal reasons for attending E.S.A. National Meetings*

A. Exchange of scientific information 775
B. To present paper or invitational address 94
C. To visit with old friends, renew acquaintances and the like 111
D. Employment contacts 20
E. Personal conferences with other scientists 236
F. Opportunities for younger members to meet older, well established members 29

II. *Preference for annual meeting*

A. Alone 1132: Spring—86, Summer—98,
B. With AAAS 126 Fall—242, Winter—591
C. With AIBS 160

III. *Preference as to location*

A. In hotel in convention city 762
B. On college campus 399
C. In resort area 60

IV. *Prefer 3 day—663 or 4 day—619, meeting.*

V. *Is the number of 249 papers submitted for 1957 meeting too many?*
Yes: 824 No: 355

VI. *Should the number of submitted papers be limited?*
Yes: 1028 No: 461

If so indicate by order of preference how this might be done.

A. Limiting these to two per member (including joint authorship) 299
B. Limiting these to one per member (including joint authorship) 416
C. Requesting *Program Committee* to establish a limit on number of papers and accepting these on priority basis 234
D. Requiring submission of typewritten ms. at time paper is presented 79

If not

A. Should we routinely plan on evening sessions?
Yes: 155 No: 70
B. Do we have too many concurrent paper reading sessions?
Yes: 70 No: 134

[1] The writer wishes to acknowledge the very able assistance of the Secretaries of the Department of Entomology, University of California, Citrus Experiment Station, Riverside, California, Mrs. Doris Ward and Mrs. Alta Hester, and of Mrs. Johanna Kizer in the burdensome task of tabulating the results from the 1,599 questionnaires returned.

C. Should we increase the number of concurrent section meetings?
Yes: 70 No: 117

VII. *Preference for more invitational papers.*
Yes: 679 No: 530

VIII. *Preference for more general sessions.*
Yes: 625 No: 556

IX. *Should all submitted papers be limited to 10 minutes?*
Yes: 1137 No: 183

X. *Should more than 2 minutes be allowed for discussion of paper?*
Yes: 487 No: 788

XI. *Is it necessary for you to present a paper to receive expenses for attendance at National Meetings?*
Yes: 401 No: 847

XII. *Shall we continue the tradition of dinner and entertainment?*
Yes: 1008 No: 277

XIII. *Type of program preferred for dinner*

A. None	46
B. Musical entertainment	156
C. Comedy	105
D. Serious address	212
E. Professional or home talent	38
F. Leave it to Local Arrangements Comm.	665

XIV. *Preference for exhibits*
Yes: 1143 No: 160

Summary and Conclusions

The excellent response to the questionnaire is an indication of the genuine interest of a large portion of the membership of this Society. This was further amplified by the nature of individual messages appended to the questionnaire which in a number of cases expressed appreciation for the opportunity of expressing personal views on many of the questions asked. We may, therefore, accept the nature of the returns received as an authoritative expression of the wishes of the membership in regard to the planning and conduct of our national meetings. The following majority opinions were expressed:

1. The primary purpose of attendance at the national meeting is the exchange of scientific information.

2. The national meetings as presently organized seem to meet with the approval of the large majority of members with regard to the following points:
   A. Meeting of the E.S.A. alone.
   B. Meeting in the winter.
   C. Meeting in a hotel in a convention city.
   However, a substantial minority are interested in meeting on a college campus and it is to be hoped that a trial meeting of this type can be held in the near future.

3. The number of papers presented at recent meetings is very evidently considered to be too many, but the membership is almost evenly divided between preference for a 3 or a 4 day meeting period.
   A. A large majority favor limiting the number of submitted papers, with the preference for limiting them to one per author including junior authorship.
   B. Despite the crowded program there is a slight majority favoring both the inclusion of more invitational papers and more general sessions. This suggests that still further limitation of submitted papers, perhaps by placing the burden on the *Program Committee* to accept these on a priority basis, as favored by many, will be necessary.
   C. The majority of those who believe that the number of submitted papers should not be limited feel that night paper reading sessions should be scheduled routinely and that there are not too many concurrent sectional paper reading sessions.

4. The present practice of allowing 10 minutes for all submitted papers and 2 minutes for discussion is favored by a substantial majority.

5. Less than one-third of those answering, indicated that it was necessary to present a paper at the meeting in order to receive expenses.

6. The present tradition of dinner and entertainment was favored by a large majority who also believed that the Local Arrangements Committee should decide on the nature of the program.

7. Most of the members think that $5.00 is the maximum desirable cost for the annual dinner.

8. The practice of presenting an array of exhibits is favored by a large majority.

Several of the questions asked were not readily amenable to mass tabulation by the hand talley method used. These included the years of membership and number of meetings attended, and the individual suggestions for improving the program. A number of interesting correlations could have been developed regarding the preferences of the membership of the various sections, or members in various categories of employment, or age classifications, but these were clearly beyond the limits of the assistance available for tabulating the questionnaires. An inspection of the summary tables tabulated as to sectional membership, did not disclose any significant differences in majority opinions regarding the questious asked.

It is believed that the information supplied by the membership will be of considerable value to future officers, governing boards, and program committees in planning future annual meetings of the Society. Our cordial thanks is hereby expressed to all of you who were thoughtful enough to complete this questionnaire.

OHIO STATE UNIVERSITY

A recent letter to the Executive Secretary from Dr. D. F. Miller, Chairman, Department of Zoology and Entomology, at Ohio State University contained the following of special interest.

1. The University Administration asked for three million dollars for enlarging and improving the Botany and Zoology Building.
2. The State Capital Planning Board approved the request, to be divided between two bienniums—1959–1960 and 1961–1962.
3. The legislature has appropriated approximately one and one-half million which is already available.
4. Emphasis will be placed upon research needs. Planning of space and equipment is getting under way.

This is concrete evidence of thoughtful leadership on Dr. Miller's part and of careful planning for the future Zoology and Entomology at Ohio State.

TRACE LEVEL RESEARCH INSTITUTE

Purdue University has announced the establishment of a Trace Level Research Institute. Interested persons and possible sponsors of research projects on chemical residues and related problems may write to John E. Christian, Trace Level Research Institute for Residues and Metabolites, Purdue University, Lafayette, Indiana.

ENTOMOLOGY AT WYOMING

Professor Robert Lavigne of the Entomology Section, Plant Science Division, University of Wyoming at Laramie has advised that they are attempting to establish an entomology library for the use of faculty and graduate students. They would greatly appreciate the receipt of entomological reprints especially in insect taxonomy, insect ecology and economic entomology.

PROCEEDINGS OF THE FORTY-THIRD ANNUAL MEETING PACIFIC BRANCH, ENTOMOLOGICAL SOCIETY OF AMERICA

Sacramento, California, June 23, 24, 25, 1959

The preliminary business meeting was called to order at 11 a.m. on June 23 by Chairman L. M. Smith. The Branch Treasurer presented the following financial report:

June 20, 1958, old balance	$1,022.32	
During the year, principally due to the registration fees, which is the principal support of the Branch, there was an income of	1,061.50	
Regular expenses during the year, which are principally that of printing the programs—total	1,186.49	
Balance on hand at the present time		**$897.32**

The Chairman then introduced Dr. H. C. Manis, Chairman-elect, who announced that the 1960 meetings would be held in the Davenport Hotel at Spokane, Washington on June 28, 29, and 30.

E. H. Littooy, Branch Representative to the Society Governing Board, welcomed Society President P. W. Oman; President-elect, M. P. Jones; and Society Secretary R. H. Nelson. He mentioned the proposed changes of location of the Society headquarters; discussed the membership of the Pacific Branch; and stated that the Governing Board is a busy group which meets for many hours at the Annual Convention.

The Chair then called on Dr. Frank Strong to present the proposal for publishing a proceedings or annals of the Pacific Branch. Dr. Strong discussed various aspects of the cost of such a publication, said that he had written to the North Central States Branch concerning their methods of handling the similar publication which they have been issuing for many years; and concluded by moving that the Pacific Branch publish the proceedings of the Branch and that the Branch Executive Committee and Chairman of the Branch be empowered to appoint an Editor for this publication. The motion was seconded by H. M. Armitage.

The motion was discussed at length by R. B. March, who recommended a "no" vote; by H. M. Armitage, who recommended a "yes" vote; and by various others. M. M. Barnes moved that the motion be tabled. The motion to table was seconded, and, on a show of hands, the Chair declared that the motion to table had carried.

In view of the fact that many had paid $1.00 at the registration desk in anticipation of the publication of the proceedings, A. E. Michelbacher moved that this money be donated to the Branch treasury. E. P. Breakey seconded the motion, which carried.

M. M. Barnes moved that there be a concensus vote taken as to the number who favor a publication of Branch proceedings. This was seconded, and, on a show of hands, 51 favored it, and 43 were against.

The Chairman announced that the paper-reading session would begin at 1:30 p.m., and the preliminary business meeting adjourned.

The Branch *Executive Committee* met in the room of the Branch Chairman at the El Dorado Hotel on the evening of June 22. Members present were L. M. Smith, H. C. Manis, L. S. Jones, E. H. Littooy, H. H. Keifer, R. E. Campbell, R. B. March, H. S. Telford, H. C. Lewis, and A. E. Michelbacher. C. B. Philip was absent. Guests were P. W. Oman, Society President, and R. H. Nelson, Executive Secretary of the Society.

E. H. Littooy announced that the Society will meet in Detroit in 1959, in Atlantic City in 1960, in Miami in 1961, and suggests that the Branch *Executive Committee* support the proposal that the 1962 meeting be held at the Westward Ho Hotel in Phoenix, Arizona. H. C. Lewis moved that the *Executive Committee* instruct the Branch Representative to promote this location at the 1959 meetings in Detroit. R. B. March seconded the motion, which was carried. E. H. Littooy said that he favored the 1961 Branch meeting to be at the Miramar Hotel in Santa Barbara. R. E. Campbell moved that the Branch secure the Miramar Hotel for the June 1961 Branch meetings, and that the Chairman-elect should be instructed to start negotiations for obtaining this site. H. S. Telford seconded the motion, which carried.

The revised Branch constitution was next presented to the *Executive Committee*. After considerable discussion, H. S. Telford moved that the document be returned to the members of the *Executive Committee*, that they write their comments on their copies and submit them to the *Constitution Committee*. R. E. Campbell seconded the motion, which carried. R. B. March moved that the new Branch Chairman reappoint the present *Constitution Committee* for further work on the constitution. H. C. Manis seconded the motion, which carried.

The Secretary moved that all Branch committees handling money give an accounting to the *Executive Committee* after each respective convention for which they are formed. L. S. Jones seconded the motion, which carried.

The Secretary moved that the *Executive Committee* install biennial chairmanships in standing committees hereinafter specified; that the Branch Chairman each year, in consultation with the Branch Chairman-elect, appoint a Vice-chairman to each of these committees—this Vice-chairman to automatically become Committee chairmen upon the retirement of the previous Chairman at the end of the Branch fiscal year; that for the first year, which is the 1959 fiscal year, the Branch Chairman will appoint committee chairmen as usual and also appoint a Vice-chairman to each committee in consultation with the Branch Chairman-elect; that the standing committees which from here on will have biennial chairmanships are: *Membership Committee, Photo Salon, Program, Arrangements*. R. B. March seconded the motion, which passed.

The Annual Business meeting of the Pacific Branch was opened at 1:30 p.m. on June 25 in the El Dorado Room of the El Dorado Hotel by Chairman L. S. Smith. The Chairman of the *Auditing Committee*, Vernon Olney, reported the Branch treasury as in good order.

Harold Madsen, Chairman of the *Membership Committee*, reported that a total of 70 new members had been added to the Branch since June 1958. He stated the Branch membership to now total 1131. Madsen said that the principal source of new members is Entomology students, and that other areas for potential growth of the Branch are Agricultural Extension Stations, State Department of Agriculture, and entomologists connected with commercial companies. On a motion the report was accepted.

C. O. Barnard then presented the following resolutions:

1. *Whereas* the Entomological Society of America, Pacific Branch, has lost through death several members since the last meeting of the Branch,

Be It Resolved that the Pacific Branch, whose Secretary has or will extend sympathy to the bereaved families, read the names: Boyden, Brandt, Chamberlin, Ferris, Foley, Graves, Katzman, McKenzie, Matsumori, Wilson. It was moved that the resolution be adopted; seconded, passed.

2. *Whereas* the Secretary of the Pacific Branch, H. H. Keifer, has well served the Society during the past year,

Be It Resolved that the members of the Pacific Branch

hereby express their appreciation of his services. Moved it be adopted. Seconded, carried.

3. *Whereas* the *Program Committee* for this 43rd meeting of the Pacific Branch—Francis M. Summers, David H. Brannon, Richard W. Gerhardt, Irwin M. Newell, Ray F. Smith, Robert W. Harper, and John E. Swift—provided an excellent program,

Be It Resolved that the members of the Pacific Branch express in this manner their thanks for the fine work of the committee. Moved it be adopted. Seconded, carried.

4. *Whereas* the Chairmen and members of the several other committees have also fulfilled in a commendable manner their assigned tasks,

Be It Resolved that the Pacific Branch express their thanks to the: *Arrangements, Arrangements for Ladies, Auditing, Constitution, Membership, Nominations, Operations, Photo Salon, Publicity* and *Registration Committees.* Moved, seconded, carried.

Stanley Strew, Chairman of the *Nominating Committee,* then placed the following Branch members in nomination: 1. For *Branch Representative* to the Society Governing Board—Cornelius B. Philip; 2. For *Chairman-elect*—Converse H. York; 3. For *Secretary-treasurer*—H. H. Keifer. On a motion by H. M. Armitage and a second, the Branch voted to accept the report, close the nominations and instruct the Secretary to cast a unanimous ballot for the nominees.

The next item of business was the election of two Members at Large (active members) to the *Executive Committee* to serve three year terms. The following were placed in nomination: R. W. Harper, Albert F. Kirkpatrick, G. F. Knowlton, Walter Ebeling, Gaines Eddy. The Chair appointed Curtis Ferris, Ronald Hawthorne and Orville Vaughn as the election committee to count the ballots. Curtis Ferris later reported that R. W. Harper and G. F. Knowlton had been elected.

R. B. March then took the floor and moved that the question of the Branch publishing a proceedings be removed from the table. The motion was seconded and carried.

March then moved that the Chairman appoint a committee to consider and develop information on various possible solutions to the problem of dissemination of information presented at the annual Branch meeting and to present the plans evolved to the membership at the next annual meeting.

There followed considerable discussion as to costs, whether or not to take a mail ballot of the entire membership, etc. This discussion included the defeat of a motion to table March's motion. March's motion was finally seconded and carried.

C. O. Barnard said that he was greatly impressed by Dr. Hansberry's talk, "Support and Direction of Research by Industrial Concerns". He said that it would go to the magazine, *Agricultural Chemicals,* and presumably be published in full by this magazine. He said that there are many who are on the mailing list; but if any others present and not on the mailing list would give him their cards or write to him, he would see that they get copies.

In response to a question by H. M. Armitage, the Chair stated that the Photo Salon, while existing at the discretion of the *Executive Committee,* has been so successful that it will be a permanent part of the Branch program.

Chairman Smith then thanked the Branch committees and Chairmen for their splendid cooperation, and turned the gavel over to the new Branch Chairman, H. C. Manis. Manis stated that there had been 120 rooms reserved at the Davenport Hotel in Spokane for the next meeting, June 27, 28 and 29, 1960. R. B. March—"I think the Branch owes a great debt of thanks to our outgoing Chairman."

Chairman Manis then adjourned the business meeting preliminary to the last paper-reading session.

Registrations totaled 308, of which 274 were members of the Branch.

Respectfully submitted,

H. H. Keifer
Secretary-Treasurer

PROCEEDINGS OF THE THIRTY-FIRST ANNUAL MEETING EASTERN BRANCH, ENTOMOLOGICAL SOCIETY OF AMERICA

Atlantic City, New Jersey, October 29–30, 1959

The thirty-first annual meeting of the Eastern Branch, Entomological Society of America, was held at the Chalfonte-Haddon Hall Hotel in Atlantic City, New Jersey, October 29–30, 1959. A total of 217 entomologists and entomology students registered at this meeting. Dr. E. N. Woodbury, Chairman-elect, presided at the meetings for Dr. Reece I. Sailer, Chairman, who was in Pakistan on government assignment. The opening general session on October 29 began with the remarks of the Executive Secretary of the Entomological Society of America, Mr. R. H. Nelson. Following this, Mr. Neely Turner, Eastern Branch Representative to the Governing Board of the Entomological Society of America, gave his report. Next, Dr. P. W. Oman, President of the Entomological Society of America, spoke on the general subject of taxonomy and insect survey.

Dr. Ordway Starnes of Rutgers University, gave a progress report on the Northeast Regional Experiment Station Project No. 36, which deals with pesticide residues in or on raw agricultural commodities.

A fine lecture on the experiences of the 1959 entomological delegation in the Soviet Union was given by Mr. L. F. Curl, of the Agricultural Research Service, U.S. Department of Agriculture. Following this, Mr. Neely Turner, Connecticut Agricultural Experiment Station, spoke on the subject, "Pesticides and Wildlife."

At the preliminary business meeting which followed, the report of the secretary-treasurer was received and approved in part, with the financial statement referred to the *Auditing Committee.*

The report of the *Membership Committee* was also received, indicating 54 new members in the Entomological Society of America in the Eastern Branch area. These reports were unanimously accepted.

Following the business meeting, three sectional meetings, chiefly on submitted papers, were held the afternoon of October 29. Section A dealt with pests of shade trees and ornamental plants, Section B with vegetable insect pests and Section C with insect biology, taxonomy, survey and forage crop pests.

The second general session was held on October 30 with Mr. Neely Turner presiding. The following well-received talks were given:

"Insecticide Resistance—A World-Wide Problem"
A. W. A. Brown, University of Western Ontario
"The Responsibilities of the Taxonomic Entomologist"
J. A. Slater, University of Connecticut

"Entomology in Youth"
PAUL MAYFIELD, Hercules Powder Company
"Novel Approaches to Insect Control"
E. F. KNIPLING, Plant Industry Station,
U.S. Department of Agriculture

Following the general session, a final business meeting was held with E. N. Woodbury presiding. Reports of the following committees were received at this time: *Auditing Committee, Committee on Insect Losses, Resolutions Committee,* and the *Nominating Committee.*

Following the committee reports, the Constitution of the Entomological Society of America, Eastern Branch, was ammended by unaminous vote of the members present to allow for scheduling of meeting times and places for more than one year in advance.

It was unanimously decided to hold the 1960 meeting on October 27 and 28, 1960, at the Hotel New Yorker in New York City. Further, the 1961 meeting was scheduled for Baltimore and 1962 meeting for Philadelphia.

Following the business meeting, the new Chairman-elect, Dr. James Grayson was escorted to the stage.

The afternoon of October 30 had two sections in session. Section D on fruit insects and Section E on insecticides, techniques and livestock pests. The evening of October 29, five selected films were shown to the membership.

Financial Statement

Cash Balance on hand, November 5, 1958	$ 984.68	
Receipts	756.00	
Total		**$1740.68**
Disbursements	661.52	
Cash Balance on hand, October 1, 1959 Deposited in Peoples National Bank of New Brunswick, N. J. (Not including 4-$1000 U.S. Bonds due 1965 held in safe deposit.)	1079.16	
Total		**$1740.68**

Respectfully submitted,

LELAND G. MERRILL, JR.
Secretary-Treasurer

Report of the Auditing Committee

Your auditing committee has examined the financial statement, books, and records of the Secretary-Treasurer, Leland G. Merrill, Jr., and finds them correct and in good order.

Respectfully submitted,

FLOYD P. HARRISON
J. B. KRING, *Chairman*

Report of the Resolutions Committee

1. *Whereas* the Eastern Branch has lost some of its members by death since the last annual meeting:

Be It Resolved that since the Executive Secretary has extended sympathy to the families of these members, the Eastern Branch further show its respect by a reading of the roll.

C. C. Alexander
E. A. Back
Robert Matheson
Herbert Matsumori

2. *Whereas* the officers and committees of the Eastern Branch have arranged for a successful meeting,

Be It Resolved that the members of the Eastern Branch express their appreciation for the leadership of its officers and the fine work of its committees.

3. *Whereas* the participants in the program have shown increasingly their cooperation in supplying abstracts of their papers,

Be It Resolved that the Eastern Branch go on record, expressing its appreciation for this contribution to the success of the meeting.

4. *Whereas* P. W. Oman, President of the Entomological Society of America, R. H. Nelson, Executive Secretary, and Neely Turner, Eastern Branch Representative to the Governing Board have brought to the Eastern Branch such excellent reports of our Society,

Be It Resolved that the Eastern Branch express its grateful appreciation to President Oman, Secretary Nelson and Representative Turner for their leadership and their attendance at our annual meeting.

5. *Whereas* the management of Hotel Chalfonte-Haddon Hall has provided excellent facilities for our meeting.

Be It Resolved that the Eastern Branch express its appreciation to the management of Hotel Chalfonte-Haddon Hall.

6. *Whereas* the meetings of the Eastern Branch and the parent Society occur at the same period of the year, thus affecting attendance at both meetings,

Be It Resolved that the Chairman appoint a committee to study the feasibility of changing the time of the Branch meeting and to canvass the membership with reference to their desires.

Respectfully submitted,

SIEGFRIED E. LIENK
ALBERT C. MILLER
WALTER E. FLEMING, *Chairman*

Report of Representative to the Governing Board

Bailey B. Pepper was the official representative of the Eastern Branch at meetings of the Governing Board held before the installation of the new President. He attended meetings Sunday, November 30, 1958, from 9 a.m. until 10:30 p.m. with breaks for meals; Monday, December 1, 2:30 until 5:30 p.m. and Tuesday, December 2, 9:30 a.m. until 5:00 p.m. Neely Turner attended part of these sessions as an observer, and officially at the meeting Wednesday, December 3, 7:30 to 10:30 p.m.

The Baltimore meeting of the Branch referred two resolutions to the Salt Lake City meeting of the ESA. The first of these, dealing with a National Institute of Entomology, was disapproved by the Governing Board and was therefore not referred to the *Resolutions Committee.*

The resolution dealing with benefits derived from sound insect-control programs was approved by the Governing Board and referred to the *Resolutions Committee.* At the final business meeting on December 3, the *Resolutions Committee* presented its report, and did not include this resolution. The Chairman of the Committee reported that his Committee had agreed to recommend only those resolutions on which the Committee agreed unanimously. There was not such agreement on this resolution, therefore, it was not presented.

At the final Governing Board meeting, this situation was discussed. It was agreed that some official action was highly desirable, and it was voted to refer the matter to the *Committee on Public Relations,* which was to draft a resolution for mail approval by the Governing Board as a Board Resolution. There has been no further action.

Dr. Pepper's report concludes "There were several actions that the Governing Board took which your representative opposed vigorously. It is the opinion of your representative that the membership of the Society is not being fully informed of what is going on in the Society and for the Society."

Since the Salt Lake City meeting, your representative has participated in affairs of the Board as required. The principal activity was the *Committee on a Permanent Home,* under the Chairmanship of Morris Rockstein of the

Eastern Branch. This Committee has recommended action which the Governing Board has approved, and on which Secretary Nelson has reported.

Dr. Pepper's conclusion as to the affairs of the Governing Board is sound. You will notice that the Board was in session at Salt Lake City all during the annual meeting, except when general sessions were on the program. It is very difficult to summarize the results of these long and sometimes difficult sessions at the final business meeting, when there is insufficient time to prepare a suitable report.

On the other hand, each Section and each Branch is represented on the Governing Board. These representatives can certainly report as fully as they desire, because no censorship is practiced on the Board. The problem facing the President and Executive Secretary is to select those items in which the general membership would be interested, and to present them as completely as possible.

I am looking forward to a definite improvement at the Detroit meetings. If such improvement is not possible under our present organization, we may have to change. It is hardly fitting to honor a man by electing him President, and then have him spend all his time at the annual meeting presiding over sessions of the Governing Board.

Respectfully submitted,

NEELY TURNER
Eastern Branch Representative

These are the committee appointments by acting Chairman Woodbury for 1960.

Eastern Branch Committees—1960

Program:	R. E. HAMMAN
	D. F. BRAY
	W. H. ANDERSON
	N. D. BLACKBURN
	D. L. COLLINS, *Chairman*
Resolutions:	J. C. KELLER
	T. L. BISSELL
	J. H. LILLY, *Chairman*
Membership:	B. C. DICKINSON, *Chairman*
Sustaining Associates:	A. E. BADERTSCHER, *Chairman*
Auditing Committee:	E. F. TASCHENBERG
	W. A. SHANDS, *Chairman*
Nominations Committee:	EDWIN GOULD
	E. R. MCGOVRAN
	J. O. PEPPER, *Chairman*
Insect Losses:	W. E. MCCAULEY
	LEO IVERSON
	J. G. MATTHYSSE
	W. E. WATERS
	B. B. PEPPER, *Chairman*
Time of Meeting Study:	F. F. SMITH
	E. N. SMITH
	C. L. HOVEY, *Chairman*

Respectfully submitted,

LELAND G. MERRILL, JR.
Secretary-Treasurer

PROCEEDINGS OF THE THIRTY-FOURTH ANNUAL MEETING SOUTHEASTERN BRANCH, ENTOMOLOGICAL SOCIETY OF AMERICA

Savannah, Georgia, January 25, 26, 27, 1960

The thirty-fourth annual meeting of the Southeastern Branch, E.S.A., was held in the DeSoto Hotel, Savannah, Georgia, on January 25, 26, and 27, 1960. Two hundred members and guests registered for the 3-day meeting.

Chairman F. E. Guyton opened the first of two Branch business meetings at 10:00 A.M., on January 25, 1960. Chairman Guyton appointed the following committees:

Auditing: T. R. ADKINS, WALTER KULASH, J. S. ROUSSEL, *Chairman.*

Resolutions: JOHN ALDEN, LACY HYCHE, WILLARD WHITCOMB, *Chairman.*

The Executive Committee's report and the report of the Representative to the Governing Board were presented for consideration by members of the Branch. A brief report on the possibility of meeting with A.S.A.W. in 1960 was presented by the chairman.

Joe Kowal introduced Chairman Guyton for his address.

M. P. Jones, President of the Entomological Society of America, represented the parent society and spoke on several topics of interest to the group. He emphasized the importance of a positive approach to our entomological problems.

During the meeting seventy-six papers were presented. In addition panel discussions on "Resistance of Insects to Insecticides" and "Use of Radioisotopes in Research on the Biology and Control of Insects" were well attended. Several subjects of general interest were discussed by invitational speakers. Two business meetings and a Corn Earworm Conference were scheduled and carried out.

Members of the Branch were active on the *Local Arrangements Committee.* H. F. Schoof was chairman of this group which did an outstanding job of providing for our needs.

In the business sessions, the following business was approved.

1. *Secretary's Report:* The secretary's report showed two communications were sent to the membership. These included ballots to be used in voting to change the name of the Branch from Cotton States to Southeastern. This action was approved by the membership and the name has been changed. Notices concerning the sale of our program and the call for papers for the 34th Annual Meeting was sent to all members. Branch correspondence was carried out as the need arose.

The entire membership was contacted on two different occasions during the year. These included notice on the proposal to change the name of the Branch from Cotton States to Southeastern and a card to be used as a ballot. The results of the ballot were sent to each member. Results of the ballot were as follows:

Total ballots sent	596
Total replies received	337
Percent replying	56.4
Total favoring name change	290
Percent favoring name change	86.1
Percent needed to change name	66.7

As you all know the name of our Branch is now Southeastern.

The total membership was advised of the Thirty-Fourth Annual Meeting and a call for papers was made at the same time. Forms for submitting titles were supplied by Dr. Kowal, *Program Chairman.* The membership was further advised on the financial condition of the Branch. Those who wanted a copy of the program mailed to them were instructed to send one dollar to the Secretary-Treasurer. Sixty-two requests were received. Members were urged to attend the annual meeting in Savannah, Georgia. Branch correspondence was carried out as needed. A history of the Branch was sent to Mr. M. P. Jones, President of E. S. A.

The latest figures available on Southeastern Branch membership shows a total of 596 members as of March 31, 1959. The *Membership Committee* will have a more up to date figure with the state by state breakdown.

An insurance policy for $700.00 was secured on the Branch projection equipment.

The financial situation of the Branch as of January 20, 1960, was as follows:

Balance on hand January 30, 1959	$189.78	
Receipts during the year	327.47	
Total		**$517.25**
Disbursements during the year	140.65	
Balance on hand January 20, 1960	376.60	
Total		**$517.25**
Balance on hand distributed as follows:		
Checking account (Bank of Leland)	224.26	
Savings account #88317, 1st National Bank of Atlanta	152.34	
Total		**$376.60**

2. *Report of the Executive Committee:* The following members of the Executive Committee met on January 24: F. E. Guyton, Charles Lincoln, C. R. Jordan, O. I. Snapp, I. J. Becnel and M. E. Merkl. Various branch problems in connection with the meeting were discussed. The registration fee was set at $2.00 and a $1.00 charge for the program was set for this meeting by majority vote. M. P. Jones, President of the Parent Society, sat in on the meeting and contributed to its success.

3. *Report of the Auditing Committee:* January 26, 1960. The members of the auditing committee inspected the records of the Secretary-Treasurer and found the book in order with all receipts and disbursements in agreement and properly documented. W. M. Kulash, T. R. Adkins, Jr. and John S. Roussel, *Chairman.*

4. *Report of the Program Committee:* Your program committee began its activities by setting as its goal for the 1960 meeting a program representing as many phases of entomology as possible. The initial call for papers and program suggestions was made in the June 1959 issue of the BULLETIN OF THE ENTOMOLOGICAL SOCIETY OF AMERICA and appeared again in the September issue. The formal call to members was made at this time.

The program included 78 submitted papers, 4 invitational speakers, 2 panel discussions, each with 4 outstanding entomologists, and addresses by the chairman of the Branch and President of the Entomological Society of America. An attempt was made to make the printed program clear and easy to use. Papers were grouped according to subject insofar as possible.

Your committee attempted to have exhibits as part of the meeting, not realizing that this was new to the activities of the Branch. Because of this, exhibits were open only to public and educational institutions.

Delay in issuing the printed program was unfortunate. It is recommended that the present committee move up its deadline for program items and rigidly adhere to the date set.

Your committee wishes to express appreciation to all those who appeared on the program and to the local arrangements committee whose excellent handling of activities was indispensable to the success of the meeting.—B. W. Arthur, C. R. Jordan, L. C. Kuitert, T. R. Pfrimmer, H. F. Schoof and R. J. Kowal, *Chairman.*

5. *Report of the Membership Committee:* At the suggestion of the Chairman, each member of the membership committee of the Southeastern Branch of the Entomological Society of America was provided with a list of members in his state by the Executive Secretary of the Entomological Society of America, Mr. R. H. Nelson. Each member, then contacted selected members who were in especially strategic positions to canvas personnel in their own laboratories, offices, or other organizations. It was felt that personal contact with prospective members is by far the most effective way of soliciting membership.

The committee wishes to thank all those branch members who so generously helped with the committee's efforts.—Horace O. Lund, *Chairman.*

6. *Report of the Representative on the Governing Board of the Entomological Society of America:* The Southeastern Branch representative on the Governing Board of the Entomological Society of America attended and participated in each session of the Board at the Seventh Annual Meeting of the Society at Detroit, Michigan. The first session started at 8:30 a.m. on November 28, and subsequent sessions were held on the afternoon and night of November 28 and morning and afternoon of November 29. The business of the Society was completed before the time for the program of addresses and papers at the Detroit meeting.

The Detroit meeting was outstanding in that it was a joint one of our Society with the Entomological Society of Canada and the Ontario Entomological Society. Nine hundred and eighty-four registered for the Detroit meeting, and the program included about 350 scientific papers. The theme of the meeting was biological control.

Southeastern Branch members nominated and elected on committees of the Entomological Society of America at Detroit were as follows:

Program—D. WOLFENBARGER, Homestead, Florida
Insecticide Terminology—J. E. BROGDEN, Gainesville, Florida
Memorial Lecture—L. D. NEWSOM, Baton Rouge, Louisiana
Chairman, Insecticide Terminology—C. N. SMITH, Orlando, Florida
Chairman, Insect Surveys—L. D. NEWSOM, Baton Rouge, Louisiana

The first Memorial Lecture in 1958 honored L. O. Howard, the second in 1959 honored C. V. Riley. The 1960 Memorial Lecture will honor J. H. Comstock and the one in 1961 will honor Thomas Say.

In compliance with a motion passed at the last annual meeting of the Branch in Memphis, your representative vigorously acted on the matter of Public Relations before the Governing Board in Detroit, with the result that the Public Relations Committee was continued as a Special Committee of the Society.

As directed by a motion passed at the meeting of the Branch in Memphis on February 4, 1959, your representative again pursued before the Governing Board of the Entomological Society of America in Detroit, the idea of getting the Parent Society to collect one dollar from each member and return this to the respective branches. The following action resulted:

"The Governing Board is sympathetic with the requests of the Pacific Branch and Southeastern Branch for aid in the solution of their financial problems. It recognizes that Branch members are designated arbitrarily, rather than by individual choice, a fact which prevents the Branches from collecting dues under the Society Constitution.

"A recent survey indicates that members of the Society on a whole do not favor the solution which the two branches have proposed (having the ESA collect an extra dollar of dues and refund this to the branches), and other branches have also disapproved this proposal. On the other hand, the Board does not take the position that each branch must solve its financial problems without help, even though some branches have done so, if the methods that have been used are not acceptable to the Pacific and Southeastern branches. Thus, although the Board cannot support the proposal to solve the problem by raising the annual dues, it invites the two branches to reconsider the problem and suggest alternative solutions within the framework of the Constitution and the above policies."

The *Committee on Insect Losses* reported that parallel committees on Insect Losses have been established in the

Eastern Branch, the Pacific Branch and the Southwestern Branch and the establishment of parallel committees in the North Central Branch and the Southeastern Branch is desired.

Your representative initiated at the Board meeting at Detroit a discussion of the procurement of desired number of reprints of articles appearing in the Miscellaneous Publications of ESA. The whole matter was finally referred to the Editorial Board of the Miscellaneous Publications of the Society, namely: K. L. Knight, Ray F. Smith, Neely Turner, R. I. Sailer and B. B. Pepper, *Chairman*.

The deadline date for submission of titles for the annual meeting of ESA has been changed to August 15. The next annual meeting will be held in Chalfonte-Haddon Hall at Atlantic City, New Jersey, November 28—December 1, 1960. Facilities to get to Atlantic City by plane, train and bus are receiving special attention.

The 1961 annual meeting of the Society will be held in the McAllister Hotel at Miami, Florida, November 27–30, 1961. Local field trips and excursions in connection with the Miami meeting are desired, and the Southeastern Branch is requested to act on this and refer its action to the *Program Committee* for that meeting.

The 1962 annual meeting will be held at Westward-Ho Inn Phoenix, Arizona, on December 3–6, 1962.

The 1963 annual meeting will be held at St. Louis, Missouri, December 2–5, 1963.

The new headquarters of the Society is located at 4603 Calvert Road, two blocks from Highway U. S. No. 1, in College Park, Maryland. The new president of ESA is M. P. Jones of the Extension Service, U.S.D.A., and the president-elect is Dr. Hal M. Harris, Head of the Department of Zoology-Entomology of Iowa State College at Ames, Iowa.

The new representative of the Branch on the Governing Board, Dr. L. Dale Newsom, Baton Rouge, Louisiana, is unable to attend the Savannah meeting of the Branch and has requested me to act in his stead here. He took office at the close of the Detroit meeting and requested me to include in this report, matters of interest that came up at the first meeting of the new Governing Board following the final business session of the Society at Detroit.

The matter of literature citation in the Annual Review of Entomology came up for considerable discussion. The editors pointed out that full citation of papers instead of the presently used abbreviated system might necessitate the omission of as many as four papers per issue. It was also pointed out that authors are given only a certain number of pages and they object to including complete titles in citations. The matter will be presented to the membership of the Society for vote.

Section A of the Society passed a resolution asking the President to appoint a committee to study the possibility of sections meeting with AIBS. The Board is in agreement with this arrangement when the situation is such that it would be desirable. Sections already have the prerogative to do so, and the President will appoint a committee to coordinate such possible joint meetings.

The Board voted to drop the idea of awarding a medal to Memorial Lecturers.

Funds to be made available from NSF and NIH may be sufficient to send 35 or 40 delegates to the International Congress in Vienna in 1960. The President will send not more than 10 *official* delegates.—Oliver I. Snapp, Southeastern Branch Representative On the Governing Board—1957–1959.

7. *Report of the Public Relations Committee:* A normal function of the Public Relations Committee has been to encourage and advise state groups regarding various activities of public relations value. However, during the past 12 months, the Committee has not emphasized state activities, trusting that the impetus of the preceding 2 years would carry on. There has been a lessening of activity at the state level during the year. It is the recommendation of the Committee that the new *Public Relations Committee* again exert leadership as the new year moves along.

Members of the Mississippi Entomological Association assisted county agents each month in organized entomological clubs.

Publicity of local entomological activities and advancements has been good in all of the states; however, in the opinion of the Committee, this phase of public relations can be expanded considerably and to good advantage at the state level.

The Committee feels that entomology has a "poor press" at this time as the result of continued release and publication of adverse materials. Such thoughts as "poisons are going to kill everybody and everything" and "insecticides don't kill insects anymore" need to be combatted with favorable material in order to build and maintain prestige and good will.

Much of the publicity of entomology in States has been handled through the agricultural editors at the various land-grant colleges. The Committee proposes that the Secretary write each such editor with an expression of gratitude from entomologists in the Southeast for the good that the many releases have done in furthering entomological knowledge.

Entomologists at the McNeese Junior College, Lake Charles, La., and several Tennessee members have a speaking schedule before advanced high school groups to discuss pros and cons of entomology as a profession.

Entomologists and related interests in North Carolina sponsored and financed trips to the meetings of E.S.A., Detroit, for two state winners in beekeeping. These 4-H Club members performed demonstrations as part of the program at Detroit. The same young people repeated the demonstrations before nine groups and on television in North Carolina.

Exhibits and "entomology talks" were presented before various high school and local club groups in Georgia and Florida, and other states by local members of the Branch.

The Committee has publicized the Branch meeting in the following manner. An advance release was issued several days before meeting time to over 200 news outlets in the nine states.

Extension entomologists were mailed a copy of this release with a request to arrange some publicity at state level. Although this request arrived at the very last minute or even too late, at least four of the nine states had local releases.

The press room, provided by the Arrangements Committee, was operated with secretarial help at the Meeting. The following members served as reporters and writers in the meeting rooms and press room:

David Young	W. G. Eden
Walter Grimes	Jim Brogden
C. R. Jordon	G. C. Labreque
W. C. Nettles	Charles Lincoln
W. C. Johnson	Bob Robertson
R. J. Kowal	Woody W. Dry

Dean Davis

A total of 17 releases were issued to news outlets including approximately 75 daily newspapers, radio and television stations, and trade journals serving the Branch area. Various members and guests have been interviewed by reporters representing local outlets.

Copies of the releases were exhibited on the bulletin board for the members to examine or comment.

The Committee has found that the program must be in hand at least 4 weeks ahead of the meeting in order to facilitate advance publicity and preparation by the Committee.

The Committee also suggests that abstracts submitted by speakers contain some "meat" rather than a statement of the subject to be presented.

The Committee urges any state group, that has not already done so, to establish an active public relations structure at the first opportunity and that the identity of the individuals be passed on to the Branch Secretary for relay to the Branch Committee so that contact may be maintained among public relations units in the Branch area.—W. E. Blasingame, E. H. Floyd and Herman S. Mayeux, *Chairman.*

A motion was made by H. S. Mayeux that the Secretary of the Southeastern Branch write each of the Agricultural editors at the various land-grant colleges in the area and express the gratitude of the entomologists in the Southeast for the good that the many news releases have done in furthering entomological knowledge.

The motion was passed by the Branch.

8. *Report of the Resolution Committee:*

Whereas the Southeastern Branch of the Entomological Society of America has completed a successful meeting at Savannah, Georgia, during the period of January 25 to 27, 1960.

Be It Resolved that:

1. The work of the *Public Relations Committee* and its chairman Herman Mayeux be highly commended and that since the impression that the public has of entomology is as important as it is that these efforts be continued in the future.

2. The *Arrangements Committee* be commended for obtaining excellent meeting rooms and other facilities which aided in making the meeting a success.

3. That appreciation be expressed for the contribution of the invitational speakers.

4. That those members of industry who provided the entomological mixer be thanked.

5. That those who furnished the exhibits be congratulated and recommended that these be encouraged and expanded in the future.

6. That the society express its deep sympathy to its member Clifford Lofgren in his recent bereavement in the loss of his daughter Joyce, that a letter of condolence be sent to Mr. and Mrs. Lofgren.

7. That the Southeastern Branch express its appreciation to:
   a. Our chairman F. E. Guyton
   b. Our chairman-elect I. J. Becnel
   c. Our secretary-treasurer M. E. Merkl
   d. Our program committee
   e. The National President of the Entomological Society of America, M. P. Jones for his attendance and talk

8. That the Branch express appreciation to Mrs. Mary Hamner, U. S. Public Health Service Communicable Diseases Center, and to Miss Elizabeth Weitz, U. S. D. A. Stored Products Laboratory, Savannah for their excellent and abundant assistance to the *Public Relations Committee* in the issuance of news releases at the Branch meeting.

9. That the Branch express appreciation to Robert E. Lee III and his Company, Union Bag-Camp Paper Corporation, Savannah for valuable assistance rendered in mimeographing and mailing certain of the news releases.

10. That the DeSoto Hotel be complimented for providing the excellent meeting rooms and other facilities and that its sales manager, Miss Barker, be personally thanked for her efforts to make our stay as pleasant as it has been.

And Be It Further Resolved that the Secretary of the Branch send to persons mentioned a copy of the resolutions affecting them.—Lacy Hyche, John C. Alden and W. H. Whitcomb, *Chairman.*

9. *Report of the Nominations Committee:* The following are placed in nomination for officers of the S.E. Branch, E.S.A. for the coming year:

(1) The two members at large to the *Executive Committee:*
   R. J. Kowal
   Gordon Barnes
(2) *Secretary-Treasurer*—J. S. Roussel
(3) *Chairman elect*—Carroll N. Smith
(4) *Representative to Governing Board* — L. Dale Newsom

Respectfully submitted,
C. M. Beckham
E. H. Floyd
Charles Lincoln
J. H. Cochran, *Chairman*

A motion was made that the Branch should not meet with A.S.A.W. in 1960. The motion carried.

Following a discussion of various meeting places for 1960, a motion was made that the 1961 Branch meeting be in the Admiral Seames Hotel in Mobile, Alabama, unless the *Executive Committee* overrules this decision after checking more closely on facilities, etc. The exact date is to be set by the *Executive Committee.* Motion carried.

A motion was made that the length of abstracts to be published in the program be referred to the *Executive Committee* for final decision. Motion carried.

Chairman Becnel announced the following committees for 1960:

Program Committee:	C. R. Jordan
	L. C. Kuitert
	H. F. Schoof
	E. C. Burns
	L. O. Warren
	B. W. Arthur, *Chairman*
Public Relations:	E. H. Floyd
	H. S. Mayeux
	W. E. Blasingame, *Chairman*

Meeting was adjourned by Chairman Becnel at 12:15, January 27, 1960.

Respectfully submitted,
M. E. Merkl,
Secretary-Treasurer

PROCEEDINGS OF THE EIGHTH ANNUAL MEETING SOUTHWESTERN BRANCH, ENTOMOLOGICAL SOCIETY OF AMERICA

El Paso, Texas, February 8, 9, 1960

The eighth annual meeting of the Southwestern Branch of the Entomological Society of America was held in El Paso, Texas, February 8 and 9, 1960.

The meeting was called to order by Chairman Clyde Bower. Following the invocation and address of welcome, Chairman Bower gave the annual address of the Chairman.

Chairman Bower appointed the following committees:

Auditing:	John J. Durkin
	Manning A. Price
	C. B. Cowan, *Chairman*
Resolutions:	G. A. Bilberdorf
	S. A. Race
	O. H. Graham, *Chairman*
Nominating:	D. C. Early
	Louis Sanchez
	C. R. Parencia, *Chairman*
Sites:	R. D. Radeleff
	Ross H. Allmon
	J. R. Brazzel
	S. R. Race
	R. R. Walton, *Chairman*

Following the appointment of Committees, the report of the Southwestern Branch Representative on the Governing Board was given by C. M. Meadows.

The remarks by President of the Entomological Society of America, M. P. Jones, were heard by the assembled group of over 200. The group also heard an excellent symposium regarding screw-worm eradication in Florida with R. C. Bushland as moderator, followed by a symposium in the afternoon on systemic insecticides with D. E. Howell as moderator. Following this symposium 51 other papers were presented to the group.

Approximately 225 members and guests enjoyed a dinner and excellent entertainment Monday evening at the La Fiesta Club in Juarez, Mexico.

During the final business session Tuesday afternoon, February 9th, Chairman Bower called for the following reports:

Treasurer's Report

Balance on hand February 12, 1959	$264.64	
Receipts during the year	414.00	
Total		**$678.64**
Disbursements during the year	124.28	
Balance in bank February 5, 1960	454.36	
Cash on hand February 5, 1960	100.00	
Total		**$678.64**
Bills outstanding February 9, 1960		**215.28**
Net balance on hand February 9, 1960		**339.08**

Respectfully submitted,
H. E. Meadows
Secretary-Treasurer

Report of Auditing Committee

We, the *Auditing Committee* of the Southwestern Branch, Entomological Society of America, have this 9th day of February, 1960 examined the receipts and expenditures of the Secretary-Treasurer of the Branch and do hereby certify that said receipts and expenditures are in order.

Respectfully submitted,
John J. Durkin
Manning A. Price
C. B. Cowan, *Chairman*

Report of Nominating Committee

The *Nominating Committee* nominated officers for 1960 as follows:

Chairman—Hugh Graham
Vice-Chairman—Neil Randolph
Member Governing Board—C. M. Meadows
Secretary-Treasurer—A. C. Gunter (2 yrs.)
Member of Executive Committee—J. R. Eyer

Report of Committee on Resolutions

Whereas, the members of the Southwestern Branch of the Entomological Society of America in its eighth annual meeting have enjoyed the friendly hospitality of the City of El Paso.

Be It Resolved, that we thank the Manager of the Hilton Hotel for the facilities provided which have contributed to our convenience and comfort

And Be It Further Resolved, that the *Local Arrangements Committee* consisting of Gordon Watts, *Chairman*, Bill Nelson, Paul Clute, Stuart Race, and Don Ashdown, be highly commended for making the meeting so pleasant and successful

And Be It Further Resolved, that thanks be extended to the *Program Committee* for planning and organizing an excellent program

And Be It Further Resolved, that thanks be extended to the management of each of the forty-one companies that so generously contributed to the success of this meeting

And Be It Further Resolved, that the Southwestern Branch correspond with the Entomological Society of American and call to the attention of the parent society that no provision now exists for including this Branch in the rotation of the sites for the National Meeting of the Entomological Society of America

And Be It Further Resolved, that the Southwestern Branch by action of the Secretary, petition the Entomological Society of America for full recognition of its status as a Branch with equal participation in the selection of the sites for the national meeting

And Be It Further Resolved, that this Branch recognizes the need for greater continuity in the management of its professional affairs and by this action abolishes the office of Vice-Chairman and establishes a new office, the Chairman-elect, in which the incumbent would serve one year and then succeed to the Chairmanship of the Branch

And Be It Further Resolved, that this Branch hereafter hold its final business session not later than noon of the last day of the meeting so as to obtain full participation of the membership in the business affairs of the Branch

And In Conclusion Be It Resolved, that copies of these resolutions be transmitted by the Secretary to the individuals who have carried out their responsibilities so effectively.

G. A. Bilberdorf
S. R. Race
O. H. Graham, *Chairman*

Report of Committee on Necrology

As far as the committee has been able to ascertain, three members of this organization have died during the past year.

Dr. Freeman M. Fuller was born near Selma, Alabama in 1924. He received B.S. and M.S. degrees from Alabama Polytechnic Institute and the Ph.D from Texas A. & M. College. Dr. Fuller was in charge of the entomology subject matter program for the Texas Agricultural Extension Service until his death on March 12, 1959.

Mr. Herbert D. Smith was born in New Haven, Connecticut in 1894. He obtained the B.S. degree in entomology from Massachusetts Agricultural College. Mr. Smith worked for the Massachusetts Department of Agriculture and the U.S.D.A. He worked in Europe, Africa, and Asia collecting, rearing and shipping insect parasites to the United States and conducting research on the biology, morphology and taxonomy of insect parasites. At the time of his death, January 21, 1959, he was cooperating with the Mexican government in establishing and distributing parasites of the citrus blackfly.

Dr. L. G. Strom of the U. S. Public Health Service at Brownsville died during the past year but since the committee has only been cognizant of the fact for a very short time, pertinent facts about him cannot be listed at this time. The committee requests the report be kept open until such information can be obtained.

The committee also asks that the secretary be instructed to send letters of condolence to the families concerned from the Southwestern Branch, E.S.A. and that a few moments of silence be observed in the memory of these men.

Respectfully submitted,
R. L. Hanna
G. A. Bieberdorf
J. R. Eyer
O. H. Graham
A. M. Hillis
W. L. Lowery

Report of Site Committee

The Site Committee makes the following recommendations:

1. That San Antonio be the Branch Meeting site in 1961.
2. That Oklahoma City be the Branch Meeting site in 1962.
3. That the next committee on Meeting Sites be instructed to study a plan by which Branch meeting

sites be rotated among the four areas of Texas, Oklahoma, El Paso—New Mexico, and Mexico.

Respectfully submitted,
R. D. RADELEFF
ROSS H. ALLMON
J. R. BRAZZEL
S. R. RACE
R. R. WALTON, *Chairman*

The above two locations were approved by the members for the next two meetings.

The new officers were installed and it was moved and seconded that the meeting adjourn.

Respectfully submitted,
A. C. GUNTER
Secretary-Treasurer

MEETINGS

SPOKANE, WASHINGTON. Davenport Hotel, June 28–30, 1960. The forty-fourth annual meeting of the Pacific Branch, Entomological Society of America. H. C. Manis, *Chairman*, Department of Entomology, University of Idaho, Moscow; H. H. Keifer, *Secretary-Treasurer*, 1112 Swanston Drive, Sacramento 14, California.

GOULD, COLORADO. Cameron Pass 4-H Club Camp, 85 miles west of Fort Collins, August 7–11, 1960. The thirty-first annual Rocky Mountain Conference of Entomologists. Philip H. Marvin, *Chairman*, 2209 Sunnymeade Road, Manhattan, Kansas; W. Don Fronk, *Secretary*, Agriculture Building, University of Wyoming, Laramie, Wyoming; T. O. Thatcher, *Treasurer*, Department of Entomology, Colorado State University, Fort Collins, Colorado.

VIENNA, AUSTRIA. University of Vienna, August 17–25, 1960. The XIth International Congress of Entomology. Dr. Max Beier, *Secretary General*, c/o Naturhistorisches Museum, Vienna I, Burgring 7, Austria.

STILLWATER, OKLAHOMA. Oklahoma State University, August 29–September 1, 1960. The eleventh annual meeting of the American Institute of Biological Sciences. J. G. Dickson, *President*, Department of Plant Pathology, University of Wisconsin, Madison 6, Wisconsin; Hiden T. Cox, *Executive Director*, American Institute of Biological Sciences, 2000 P Street, N.W., Washington 6, D. C.

JACKSONVILLE, FLORIDA. Robert Meyer Hotel, September 8 and 9, 1960. The forty-third annual meeting of the Florida Entomological Society, L. A. Hetrick, *Secretary*, P. O. Box 2425, University Station, Gainsville, Florida.

SASKATOON, SASKATCHEWAN, CANADA. September 12, 13, 14, 1960. The tenth annual meeting of the Entomological Society of Canada. B. Hocking, *President* of the Entomological Society of Canada, University of Alberta, Edmonton, Alberta; J. G. Rempel, *President*, Entomological Society of Saskatchewan, University of Saskatchewan, Saskatoon, Sask.; C. H. Craig, *Secretary*, Entomological Society of Saskatchewan, Canada Agriculture Research Branch, University Sub P. O., Saskatoon, Sask., Canada.

PALM SPRINGS, CALIFORNIA. Palm Springs Riveria Hotel, September 24–26, 1960. The thirty-first annual meeting of the Western Agricultural Chemicals Association. C. O. Barnard, *Executive Secretary*, 2466 Kenwood Avenue, San Jose 28, California.

CORANADO, CALIFORNIA. Hotel del Coranado, September 27–29, 1960. The twenty-seventh annual meeting of the National Agricultural Chemicals Association. J. V. Vernon, *President*, Food Machinery and Chemical Corporation, New York, New York; L. S. Hitchner, *Executive Secretary*, National Agricultural Chemicals Association, 1145 19th Street, N.W., Washington 6, D. C.

BETHESDA, MARYLAND. National Institutes of Health, October 4–7, 1960. The tenth annual Instrument Symposium and Research Equipment Exhibit. James B. Davis, *Exhibit Manager*, National Institutes of Health, Bethesda, 14, Maryland.

TULSA, OKLAHOMA. Mayo Hotel, October 16–20, 1960. The twenty-seventh annual meeting of the National Pest Control Association. Harold Schnorrenberg, *President*, 1830 Linwood, Oklahoma City, Oklahoma; R. E. Heal, *Executive Director*, National Pest Control Association, 250 West Jersey Street, Elizabeth, New Jersey.

NEW YORK, NEW YORK. New Yorker Hotel, October 27–28, 1960. The thirty-second annual meeting of the Eastern Branch, Entomological Society of America. E. N. Woodbury, *Chairman*, Hercules Research Center, Wilmington, Delaware; L. G. Merrill, Jr., *Secretary*, Department of Entomology, Rutgers University, New Brunswick, New Jersey.

ATLANTIC CITY, NEW JERSEY. Chalfonte-Haddon Hall, November 28–December 1, 1960. The 1960 annual meeting of the Entomological Society of America. M. P. Jones, *President*, Extension Entomology, USDA, South Building, Rm. 4150, Washington 25, D. C.; L. G. Merrill, Jr., *Chairman, Local Arrangements Committee*, Department of Entomology, Rutgers University, New Brunswick, New Jersey; E. N. Woodbury, *Chairman, Exhibits Committee*, Hercules Research Center, Wilmington, Delaware; Roy R. Kriner, *Chairman, Photo Salon*, 216 North Carlisle, Greencastle, Pennsylvania; R. H. Nelson, *Executive Secretary*, Entomological Society of America, 4603 Calvert Road, College Park, Maryland.

HOLLYWOOD, FLORIDA. Hollywood Beach Hotel, December 3–9, 1960. The forty-seventh annual meeting of the Chemical Specialties Manufacturers Association. George W. Fiero, *President*, Esso Standard, Division of Humble Oil and Refining Company, New York, New York; A. A. Mulliken, *Secretary*, Chemical Specialties Manufacturers Association, 50 East 41st Street, New York 17, New York.

NEW YORK, NEW YORK. Commodore Hotel and other nearby hotels, December 26–31, 1960. The 1960 annual meeting of the American Association for the Advancement of Science. Thomas Park, *President*, Department of Zoology, University of Chicago, Chicago 37, Illinois; Dael Wolfle, *Executive Officer*, American Association for the Advancement of Science, 1515 Massachusetts Avenue, N.W., Washington 5, D. C.

GEORGIA ENTOMOLOGICAL SOCIETY FIRST P. W. FATTIG ENTOMOLOGY SCHOLARSHIP

Nancy Jane Craft, outstanding sophomore student at Emmanuel College at Franklin Springs, Georgia, is the winner of the first P. W. Fattig Entomology Scholarship at the University of Georgia. The award was made by Mr. James W. Maxwell, President of the Georgia Entomological Society, at the Society's twenty-fourth annual banquet in Athens on Wednesday evening, March 30. The Georgia Society—the first state entomological society to offer such a scholarship—sponsors the scholarship through the University of Georgia Foundation and the Georgia Alumni Society. The Scholarship pays the tuition of an outstanding junior or senior student majoring in entomology.

Miss Craft was valedictorian of her high school class and has an outstanding academic record at Emmanuel College. She has also been active in science fair work and student activities, both in high school and in college.

Miss Craft will begin her work in the entomology department at the University this fall, when it is expected that the work will be housed in the new Science Center with the most modern facilities. She will join about 25 other undergraduate entomology majors and five or six graduate majors.

The Georgia Entomological Society is an affiliate of the Entomological Society of America.

CORRESPONDENCE PEST CONTROL COURSE OFFERINGS AT WASHINGTON STATE UNIVERSITY

The third correspondence course in pest control will be available in May of 1960. This course "Principles of Pest Control" is designed primarily for pest control operators in urban and suburban communities, although sanitarians and other public service pest control officials will also find it of value. The syllabus will comprise 150 to 200 pages and comprises the following chapters:

1. Classification of insects.
2. Insect morphology and physiology.
3. Insect development and metamorphosis.
4. Pest control methods.
5. Pest control chemicals.
6. Pest control equipment.
7. Household and vector pests.
8. Stored product pests.
9. Rodents.
10. Lawn and garden pests.
11. Wood destroying fungi.
12. Structural pests.
13. Miscellaneous pests (bats, wasps, centipedes, scorpions, etc.).
14. Fumigation.
15. Weeds.
16. Pest control safety.
17. Pest control administration.
18. Public relations.
19. Pest control and the law.

The course was developed, at the request of the Pacific Northwest Pest Control Association, by Milton Buehler, Special Assistant for Entomology for Wood Preservation, U. S. Navy, Seattle. Various departments of the State University—Entomology, Zoology, Plant Pathology and Agronomy (weeds), assisted in its preparation. Mr. Buehler is well qualified for this assignment. He has had 18 years of pest control experience. He has owned and operated a pest control service; he has been employed by the Fish and Wildlife Service in rodent control, and has served as consultant for the U. S. Public Health Service and for the past few years has had pest control duties with the Navy. A certificate will be issued to the students completing the course.

The two other courses are in Agricultural Entomology. One is offered for 3 State University credits, the other is a non credit course. Both courses are designed primarily for those who have not had previous courses in entomology. The studies are basic, designed primarily for persons particularly interested in agricultural entomology—farmers, fieldmen, custom spray aerial and ground applicators, extension agents, vocational agricultural teachers, and related fields. The insect problems arising in the Pacific Northwest are stressed. The courses were developed by Dr. Carl A. Johansen, Assistant Professor of Entomology, Washington State University.

Persons interested in these courses should write to: General Extension Service, Washington State University, Pullman, Washington.

REPORT OF THE MANAGING EDITOR

This report which was presented to the Governing Board at the Detroit Meeting is printed on page 38 and 39 of the March 1960 BULLETIN. However, the actions of the Governing Board in regard to the report were omitted by error. The following should be appended to the report.

Governing Board Action

The report was accepted by the Governing Board. The Board voted to adopt the recommendation as follows. The committee is to be a Governing Board Committee and is to be called the *Society Committee on Publications*. It is to consist of three members appointed by the President. The members are to be selected one from each year group on the Board. The retiring member is to be replaced by the new President each succeeding year. This committee shall have the purpose of deciding all publication policies submitted to them by the Managing Editor.

GENETICS AND THE E. S. A.

By GEORGE B. CRAIG, JR., DONALD G. COCHRAN, AND WALTER C. ROTHENBUHLER

Although insects are commonly used as tools for genetic research, little information on insect genetics is reported in entomological circles, either through the media sponsored by the ESA or through other entomological outlets. Is it possible that we entomologists have tended to feel that *Drosophila* is not an insect or that genetic principles do not pertain to entomology? Within the ESA we consider physiology, morphology, taxonomy and bionomics as basic disciplines within entomology, but the same has not been true of genetics. In spite of the central position of genetics in modern biology, we have perhaps too seldom emphasized genetics in the basic curriculum of the student of entomology. Within recent years there have been many entomological geneticists but few genetical entomologists.

Presently, a healthy reversal of this tendency may be noted. The world-wide spread of resistance to insecticides through genetic selection has convinced many of the importance of genetics in the training of entomologists. Physiologists and toxicologists are giving more attention to strain variation in their experimental material. Systematists and ecologists are becoming more concerned with variations of populations with a species. Formal genetics (studies of genes, mutations, linkage and the like) are being developed for many groups other than the "classical" forms used for genetic studies in the past, *i.e.*, *Drosophila*, *Habrobracon*, silkworms, etc. Groups currently being studied from the genetic point of view include *Tribolium*, ladybird beetles, stink bugs, spider mites, certain butterflies, cockroaches, mosquitoes (*Anopheles*, *Culex*, *Aedes*), honey bees and so on.

Within entomological organizations there is increasing evidence of recognition of the importance of genetics. Recent international congresses have had separate sections devoted to genetics and cytogenetics. At the Detroit meeting of the ESA, there were at least 15 papers which could be classified as genetical. In addition, one of the speakers at the plenary symposium emphasized the potential value of genetic techniques in the biological control of insects. It would appear that the time is ripe for encouragement of genetics within the ESA.

We believe it would be desirable for entomologists with genetical interests to meet as a group at the 1960 Annual Meeting in Atlantic City. To facilitate this, we propose a formal session for reading submitted papers on insect genetics. This would bring together the papers on genetics currently scattered throughout the sectional programs. The proposed session would have no sectional status as such but would be organized under the auspices of Section C (Insect Biology). If sufficient interest is demonstrated at this session, further discussion and organizational plans concerning the place of genetics within the Society could be undertaken. Those having papers on any aspect of insect genetics are urged to request placement in the genetics session when the call for papers for the annual meeting is announced.

PESTICIDE-WILDLIFE PROBLEMS

The National Academy of Sciences held a January 1960 meeting to determine if need exists for a standing committee, not associated directly with either pesticide or wildlife interests, to advise on broad policy matters in this controversial field. Initial budget to support an executive director and a secretary was estimated at $35,000. If the money can be produced, such a committee will be formed. Major problem of the committee would be to sort out the emotional and factual elements in the conflict of interest, determine if the facts present a real or only an imaginary problem, fill the gaps with research and then perhaps establish some criteria of relative values.

BROCHURE NUMBER 1

Opportunities in Professional Entomology

The Governing Board at the Houston meeting in 1954 authorized the publication of Brochure No. 1. The manuscript had been under preparation for some time by a committee under the chairmanship of M. P. Jones. The credit for getting a green light on publication of the booklet goes to George C. Decker. The Board set up the following regulations:

1. The first printing was to be 10,000 copies and to cost about $500.
2. Every member of the Society was to receive a gratis copy.
3. Prices were established for various quantities.

Early in the summer of 1955 the manuscript was taken to the Washington office. Dr. Poos did most of the editing which was complicated by the necessity of cutting down the pagination to fit the budgeted $500.00. The Executive Secretary, new on the job, contributed a few lines and wrote the concluding paragraph. The printing bill for the 10,000 copies was $525.00. We sent a gratis copy to every Society member and have continued this for all new members. The price list is printed on the inside back cover for the benefit of those who need the booklet in quantity. A free copy is sent to every student or teacher who writes us in regard to entomology as a profession or hobby.

In addition to the initial 10,000 copies we have had 5,000 printed in 1956, 2000 in 1958, 1000 in 1959 and 2000 in April, 1960. This totals 20,000 copies of which less than 2,000 remain on hand. The total costs for the five printings were $1,250.90. We have sold 12,328 copies for a total of $1,557.58 as of March 31, 1960. In addition we have mailed out or otherwise distributed about 5,800 free copies.

Except for a few small editorial changes and the correction of the Society address in the 1960 reprinting, the booklet has remained unchanged. We are aware that not all of our members are in accord with Brochure No. 1 as now written and are equally aware that complete agreement among 4,300 members is impossible. The booklet is serving its intended purpose well, and, in addition, is not a red ink item. We salute those who sent it down the ways.

TENTH PACIFIC SCIENCE CONGRESS

The Tenth Pacific Science Congress of the Pacific Science Association will be held at the University of Hawaii, Honolulu, from August 21 to September 6, 1961, sponsored by the National Academy of Sciences, Washington, D. C., and Bernice P. Bishop Museum, with the cooperation of the University of Hawaii. Scientific sessions will be held from August 21 to September 2, with a post-sessional field trip through September 6. Please address inquiries to: Secretary-General, Tenth Pacific Science Congress, Bishop Museum, Honolulu 17, Hawaii, U.S.A.

1963 CONGRESS OF ZOOLOGY

The XVIth International Congress of Zoology will be held in Washington, D. C., August 21–27, 1963, under the presidency of Dr. Alfred S. Romer, Alexander Agassiz Professor of Zoology and Director of the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.

These arrangements were made by a provisional organizing committee operating under the National Academy of Sciences National Research Council, a private organization of scientists in the United States.

MEMBERS IN THE NEWS

HOWARD J. GRADY was named President of the California Spray-Chemical Corporation of Richmond, California as of February 1, 1960. He is an entomologist, a member of the Entomological Society of America and has been with the company for 34 years.

E. J. NEWCOMER of Yakima is President of the Washington State Horticultural Association for 1960.

ERNEST R. BARBER of New Orleans writes that at 76 he is still going strong as President of Barber Laboratories in that city. He has conducted this organization for more than 50 years being one of the pioneer pest control operators with college training in entomology.

C. O. BERG, Cornell University professor, has been given a grant by the National Science Foundation to study European marsh flies. This is a two year grant and he will be in Europe for part of this time.

M. F. WHARTON of Phoenix was elected president of the Arizona Agricultural Chemicals Association for 1960.

ALBERT HARTZELL of the Boyce Thompson Institute for Plant Research received the 1960 award of the New York State Arborists Association at their January meeting. This was for "outstanding leadership, devoted service and interest in the better appreciation and preservation of shade trees."

ERNESTINE THURMAN of the National Institutes of Health at Bethesda, Maryland was featured recently in the *Washington Sunday Star* as the only woman entomologist commissioned in the United States Public Health Service.

C. E. MICKEL is retiring as Head of the Department of Entomology at the University of Minnesota as of June 30, 1960, after 38 years of service. He was the first extension entomologist at Nebraska University and also the first at Minnesota. A. C. HODSON will succeed Dr. Mickel as Head of the Department on July 1, 1960.

HUGH E. THOMPSON of Kansas State University was listed in the membership list in the December 1959 BULLETIN as Thomas, Hugh E. We regret this typographical error and ask you to make the correction on page 209 of the BULLETIN mentioned.

B. ELWOOD MONTGOMERY of Purdue University has received a National Science Foundation research grant which will permit him to spend some time in Europe in connection with his monographic studies of the New World Dragonfiles. He will attend and give two papers at the XIth International Congress of Entomology in Vienna and is on the program of the pollination symposium in Copenhagen.

MILITARY ENTOMOLOGY

A course in Military Entomology will be presented by the Armed Forces Pest Control Board, July 10–23, 1960, at the Naval Medical School, National Naval Medical Center, Bethesda, Maryland.

The third annual presentation of this program in advanced military entomology is constructed to:

a. Provide training in military entomology for active duty and reserve entomologists in the military services.

b. To make known to non-military individuals and organizations the contributions which the military services have made and are making to the science of entomology and the control of arthropod pests and vectors.

c. To indicate the nature of the entomological problems which confront the Armed Forces and to stimulate scientific research in basic and applied problems. Information concerning this training conference is available from the Armed Forces Pest Control Board, Forest Glen Section, Walter Reed Army Medical Center, Washington 12, D. C.

COST POLICY FOR RESEARCH GRANTS

In connection with its programs for the support of basic research, the National Science Foundation for some years has followed the policy of permitting institutions to apply for and receive, as an indirect cost allowance, up to 15% of the total direct costs involved in approved grant proposals.

Because of rising costs of administration and the adverse effect of such increases upon the ability of institutions to carry on research work, the Foundation has made a revision in its indirect cost policy.

Pending completion of a study of the entire problem of indirect costs, the Foundation herewith announces that, effective January 1, 1960, it will permit institutions to request up to 20% of total direct costs as the allowance for indirect costs in research proposals. In no event, however, may such indirect costs exceed the last "audited" or "negotiated" rate approved for the institution by a Federal agency for purposes of Government-sponsored research and development.

Thus, an institution with an "audited" or "negotiated" indirect cost rate so approved may claim such rate provided it does not exceed 20% of the total direct costs.

This announcement will be reflected in the forthcoming revision to the 1955 edition of the National Science Foundation brochure on "Grants for Scientific Research."

WASHINGTON STATE ENTOMOLOGICAL SOCIETY

The ninth meeting of the Washington State Entomological Society was held in Portland, Oregon, September 18 and 19, 1959 at the Portland State College. The meeting was held jointly with the Oregon Entomological Society. President M. C. Lane and Secretary-Treasurer M. H. Hatch, are members of the Entomological Society of America.

NEW CORRESPONDENCE COURSE FOR THE PEST CONTROL INDUSTRY

A joint undertaking between Purdue University and *Pest Control* magazine in the area of pest control education is about to be realized. A new correspondence course in pest control technology is being written especially for the pest control industry.

The course, in preparation since 1957, is being written by Dr. Lee C. Truman of Indianapolis, who has been trained in both education and the practical phases of pest control. An Editorial Board is working with Purdue and Doctor Truman in the preparation of the material. Members of the Board include: Dr. John V. Osmun, Dr. Howard O. Deay, and William L. Butts, all members of Purdue's Entomology Department, Dr. Harry C. Pratt, in charge of insect and rodent control training for the U. S. Public Health Service, George C. Hockenyos, Springfield, Illinois, PCO who has helped author several NPCA reference publications, Dr. Philip J. Spear, Technical Director of the NPCA, and James A. Nelson, editor and publisher of *Pest Control* magazine.

The course will be liberally illustrated with photographs and drawings and will be an authoritative presentation of the most reliable information on insects, rodents, chemicals, and control methods.

Pest Control magazine will publish the 18 lessons in 18 successive issues beginning about the first of January 1960. PCO's who wish to do the required reading, answer questions by mail, and have their answers graded by staff members of Purdue's Entomology Department, will, upon successful completion of the course, be issued a Certificate of Accomplishment by Purdue University. Interested persons should write the Department of Entomology, Purdue University, Lafayette, Indiana.

SATURNIID INFORMATION

The population of giant silk moths seems to be steadily declining. It is quite possible that the Lepidopterists have obtained and published information on this matter. However, if they have, it does not seem to be widely distributed or understood. Mr. Woodbridge Williams of the *National Geographic Magazine* 16th and M Streets, N.W., Washington 6, D. C., has been interested in the prevalence of Saturniids in the wild and would like to hear from entomologists having first-hand knowledge of the situation.

RESEARCH LABORATORY GRANTS

The National Science Foundation announced that the last closing date for receipt of proposals for support of renovation and/or construction of graduate level (doctoral) research laboratories was March 1, 1960. Proposals received after the March 1, 1960 closing date are to be reviewed following the next closing date which is expected to be September 1, 1960.

This program will continue to require at least 50 per cent participation by the institution with funds derived from non-Federal sources. Proposals may be submitted for modernization or construction of research laboratories, including laboratory furnishings but not including apparatus or equipment, in any field of the natural sciences. For the present, this Program is restricted to those departments which have an on-going program leading to the Ph.D. degree. Support of facilities to be used primarily for instructional purposes will not be considered. It is suggested that, depending on the discipline involved, preliminary inquiry be made to either the Division of Biological and Medical Sciences or the Division of Mathematical, Physical, and Engineering Sciences, National Science Foundation, Washington 25, D. C. Information concerning the Program and instructions for preparation of proposals may be obtained upon request.

NECROLOGY

EDWARDS, GEORGE A. 45. Insect physiologist and toxicologist. In Albany, New York. March 1, 1960.

GAHAN, A. B. 79. Retired USDA taxonomist, world authority on the Chalcididae. Charter Member with 53 years of membership. Fellow in the former Entomological Society of America. Emeritus Member. In Prince Georges General Hospital, May 23, 1960.

JOSEPH, M. T. 43. Entomologist in the Indian Institute of Agricultural Research. In New Delhi, January 5, 1960.

SHERMAN, JOHN D., JR. 87. Retired dealer in entomological and related books and periodicals. Forty nine year member, Fellow in 1939. In a Nursing Home in Hartsdale, New York, April 17, 1960.

STEARNS, LOUIS A. 68. Retired Head, Department of Entomology, University of Delaware. Emeritus member, 40 year member. In Newark, Delaware, March 4, 1960.

STROM, LAWRENCE G. Public Health entomologist. 25 year member. In Brownsville, Texas, August 6, 1959.

YATES, WILLARD W. 71. Retired USDA entomologist. Emeritus member. At his home in Corvallis, Oregon, April 16, 1960.

BOOK REVIEWS

LAND AND WATER BUGS OF THE BRITISH ISLES, by T. R. E. Southwood and Dennis Leston, Frederick Warne and Co., Ltd., London and New York, 1959. 436 pp. illus. 30/-Net., or $4.20.

This book about bugs—the 509 kinds that inhabit the British Isles—is a remarkably interesting and useful faunal guide. British entomologists, ecologists, horticulturists and even farmers will find much worthwhile information between its covers. With the help of the simple, direct keys and the eight-page glossary any entomologist with a reasonably good microscope should be able to identify most of the species of Heteroptera to be found in the fields, forests and waterways of Britain. The ecologist will find a vast amount of information about the food habits and life histories of the species that live in these varied habitats. The British horticulturist or farmer does not need to take the bug that is attacking his plants to a "specialist" in order to get a reasonably reliable notion of its identity. He will only need to thumb through the book and compare his specimens with the figures on 32 colored and 31 black and white plates, each of which ordinarily bears the likeness of six kinds of bugs. It is true that some species, not figured, will resemble figured species so closely that the untrained eye will not distinguish between them; however, there is another trick in the basket. Most plant feeding bugs are highly host specific, and if the name of the host is known, all species of bugs reported to live on this plant can be found by looking up the plant's name in Appendix 3. If more than one kind of bug is listed, reference to the illustrations should soon establish the probable identity of the specimen concerned.

The book also includes a useful appendix section on technics of collecting and studying bugs. This should be particularly helpful to the young amateur and to the general biologist who wishes to send his specimens to a hemipterist for identification. Much of the interest and value of this book may be attributed to the emphasis placed on natural history as opposed to physiology and anatomy. The relegation of virtually all descriptive information to the keys, combined with a lively prose style makes for easy reading.

There are instances where the word imagery becomes a bit extravagant. It is not likely that many people other than the authors are aware of or likely to detect the "noisy and smelly" characteristics of *Kleidocerys resedae* (page 86). The utility of including chromosome numbers for many species and the paragraph of instruction for making preparation for study of chromosomes may be questionable. However, such material occupies little space and may stimulate some adventurous systematist to delve more deeply into the application of this technic to taxonomic problems.

It might not be amiss to comment that readers should not assume that the family and subfamily names used here are permanent or universally applied. The authors contend that they have attempted to keep in line with the modern systems of classification; however, in this age of specialization no modern author has had a panoramic view of Heteroptera equal to the task of providing a generally acceptable "improved" system. While most of the names are here to stay, the endings that determine whether they are families, subfamilies or tribes are often established as well by the flip of a coin as by mature evaluation of characters.

Fortunately these issues are quibbles that in no way detract from the usefulness of this book. It is a contribution to an inventory of our biological assets and liabilities and if biology is ever to attain status as an exact science, this kind of inventory must be extended to all organisms residing with us on the globe we call earth.

R. I. SAILER
Entomology Research Division
U. S. Department of Agriculture

CYNIPID GALLS OF THE EASTERN UNITED STATES, AN AID TO THEIR IDENTIFICATION, by Lewis H. Weld, 5½ by 8½, 160 pages, 354 figures, paper covers. Privately printed, 1959.

For sale by:
The Entomological Society of Washington,
c/o Division of Insects,
U. S. National Museum,
Washington 25, D. C.
or by:
The author
6613 N. Washington Blvd., Arlington 13, Va.
Price $2.00 postpaid.

Morphology of Cynipoidea (30 figs.); key to subfamilies; keys to the genera in each subfamily (not elsewhere available now that CYNIPOIDEA (Hym.) 1905–1950 is out of print); then a synoptic list of all the 489 species described from the area (as far west as central Texas).

The rest of the paper is devoted to the last and only subfamily which is phytophagous, living in plants either as gall makers (331 species) or as guests (45 species). Listed with short descriptions are the galls on each of thirty native kinds of oak (the first time a host index of this sort has been attempted for this area). They are arranged by the part of the plant affected, root, flower, acorn, bud, leaf and stem.—(including 72 kinds that have never been reared—53 of these are figured). Then a list of galls on plants other than oak (48 species—34 are figured). In case the host oak is not known by even a common name all the described root galls on oak (regardless of host) are listed in one place, likewise the flower, acorn, bud, stem and leaf galls. There are notes on collecting, rearing and mounting. In the notes on the 29 pages of half-tone illustrations of galls the magnification and host of the photo is indicated, a list of other oaks on which the species occurs and the date of the emergence of the maker. 163 described oak galls are thus shown: 18 root galls, 4 flower galls, 14 acorn galls, 25 bud galls, 36 stem galls and 66 leaf galls. The photos have suffered some loss in detail in reduction and their labels are dim. There are two pages of line drawings of galls. Attention is called to many cases of delayed emergence of the maker followed by emergence over a series of years. There are many suggestions for further contributions to a knowledge of life histories.

TANGLEFOOT LIVES AGAIN, by Ralph Bolt. *Printers' Ink*, August 8, 1941, pp. 17–19, 76, 77.

Manufacture of Tanglefoot[1] began in Grand Rapids, Michigan, in the summer of 1885. Otto and William Thum needed money for education so they began making sticky fly paper in the back room of their father's drug store. Their first customers were druggists who, by getting the paper readymade, were relieved of the messy chore of making it themselves. Every family used fly paper. Flies were everywhere. They came from back-yard "powder rooms," stables, manure piles, and garbage.

The brothers improved the pharmacopoeia formula for the sticky material, sized the paper with glue to prevent the sticky coating from soaking through, found out that if the sheets were placed face-to-face they could be stored longer, developed machinery for applying the sticky compound, and made a waxsealing border around the sheets to protect them from air. In 1887 the Thum brothers obtained a patent on their product and a copyright on the name Tanglefoot.

Soon the company's business extended throughout the United States and all over the world. Everything looked good. But things slowly began to change. The automobile came to displace the horse. Educational anti-fly campaigns, better sanitation, and increased use of insecticides and

[1] It's in the dictionary: "A trade-mark applied to a sticky substance consisting of rosin and castor oil . . ."

spray guns narrowed the market for Tanglefoot Fly Paper. When Mr. Bolt wrote his report fly paper was still used by the Army and in rural districts, and the export market was still active. But the unlimited demand for Tanglefoot belonged to history. Ball-park billboards no longer proclaimed the usefulness of Tanglefoot and Bull Durham. Why advertise that the center fielder of the Chicago Cubs, for example, caught 321 flies in 1940 while Tanglefoot caught 70 billion? The good old days were over.

It became necessary to reorganize the Tanglefoot business. Several items of merchandise were abandoned; Tanglefoot Fly Paper, Sure-Catch Fly Ribbons, Tanglefoot Difusor (a steam-operated atomizer), and Tanglefoot Difuso (a pyrethrum base insecticide for use with the Difusor), Tree Tanglefoot, and Tanglefoot Gummed tape (plain and colored) were retained. The sales force was reduced from 80 commission salesmen to 12 on salaries, and wholesale outlets only, chiefly paper dealers, were used. Millions of shade tree owners became new customers for Tree Tanglefoot in addition to the former buyers who were mostly orchardists, vineyardists, and park and cemetery superintendents.

This reviewer wrote to the Tanglefoot Company in Grand Rapids and received a helpful reply from N. H. Battjes, Secretary, who sent a copy of Ralph Bolt's article. The old Company is again a family enterprise, Mr. Battjes and his brother own it. When they bought the business some 10 years ago the Company was about finished. Fly Paper and Fly Ribbons had been discontinued at about the end of World War II, before the brothers took over, and now the Company specialized in Tree Tanglefoot, the Difusolier sprayer, liquid Difuso insecticide, and Tanglefoot paint for tree wounds. So the Tanglefoot Company is still in business after 74 years, and doing all right.

Those who remember the days when *Musca domestica* L. swarmed in the kitchens of the United States can recall with sadistic satisfaction the sight of a cocky fly, immune to injury or destruction by the unaided human hand and probably loaded with typhoid bacilli, alighting on a fresh, shiny, fragrant sheet of Tanglefoot. Astonishment, anger, and panic are quickly registered, in that order. With the atomic strength with which flies are endowed the insect buzzes and struggles. No luck! Down goes a wing into the modern entomological La Brea tarpit. Despair sets in. Another wing gets stuck. The end!

Several fringe effects of the household use of Tanglefoot Fly Paper may be mentioned. Frequently the question of when to change a well-populated sheet came up for discussion. Lively disagreement might be generated. Did the mired multitude serve as decoys? Had the onrush of diminishing returns gone far enough? (What a fascinating project for present-day entomological statisticians!)

There was, in many families, a special day to date things from: the time the family cat landed on a sheet of Tanglefoot. Or when the hired man's best girl got her tresses in the goo.

PEREZ SIMMONS
U. S. Department of Agriculture

HANDBOOK OF PEST CONTROL; THE BEHAVIOR, LIFE HISTORY, AND CONTROL OF HOUSEHOLD PESTS, by Arnold Mallis. Mac Nair-Dorland Company, 254 West 31st Street, New York 1, N. Y. 1960. 6 x 9 inches, third edition, 26 chapters, 1132 pp., 238 illus. Price postpaid: $12.50 in the U.S.A.; $13.00, elsewhere.

The first edition of this well-known handbook appeared in 1945 and contained 554 pages and 139 illustrations. The second edition was published in 1954. It was a very complete revision and contained 1068 pages and 231 illustrations. Many of the illustrations in the second edition were replaced by better ones in the recent third edition in which all control measures were brought up-to-date and the more important biological advances were included.

Space is not available here to list the many subjects that were especially subject to revision, such as, new anticoagulants against rats, insecticides for control of chlordane-resistant German cockroaches, latest FHA recommendations for soil poisons against termites, fumigants, mites, mosquitoes, mothproofers, repellents, and many others. Many new references have been added. Actually about 60 pages were deleted from edition 2, which has been out of print for more than a year, and about 120 pages of new material have been added.

While this standard reference book will probably be of most use to pest control operators, insecticide manufacturers and dealers, it should also be a very helpful reference text for chemists, entomologists, and others interested in modern methods and materials for control of a wide variety of household and industrial insects, rodents, et cetera. The book is printed on an excellent grade of paper and has a sturdy binding in gray cloth, gold stamped. The author and the publisher deserve commendation for producing this excellent handbook, the only one of its kind.

F. W. Poos

METHODS OF TESTING CHEMICALS ON INSECTS, VOLUME 2, Edited by Harold H. Shepard, U. S. Department of Agriculture, 8vo., cloth, 248 pp., illus., Burgess Pub. Co., Minneapolis 15, Minn., 1960. $5.00.

It is a pleasure to direct the attention of colleagues to this newly issued work, the first volume of which appeared in 1958 and already has attained a definite place in our literature on the subject. It will be remembered that several years ago the accumulation of articles was started by the Entomology Subcommittee, Chemical-Biological Coordination Center of the National Research Council treating of the fundamental phases (effects of chemicals on the physiology of the insect) and relating to general techniques for applying chemicals to insects, the series ultimately to be published as a manual of entomological testing methods, under the editorship of Dr. Shepard. It was expected for a time that this manual would be published by the Council, however, reorganization of the Coordination Center and finally its termination resulted in publication of the work commercially. It will also be remembered that the volume issued in 1958 deals mainly with techniques for determining the effects of chemicals upon life processes of insects and with laboratory methods of exposing insects to toxic chemicals. This newly issued second volume of the series contains discussions of the factors affecting experimental results as well as a group of papers relating to the screening of candidate insecticides for specific purposes. Ultimately it is hoped that the series may cover a broad range of techniques used in theoretical and applied studies. Except when essential to a standardized method, the culture of insect populations for test purposes is generally not described.

Some idea of the scope and authorship of this work may be gained by enumeration of the respective chapters, as follows: "Pre-Test Conditions Which Affect Insect Reaction to Insecticides," by Yun-Pei Sun, Shell Development Company; "Factors Affecting Insects During Exposure to Insecticides," by J. C. Gaines and W. J. Mistric, Jr., Texas A. & M. College; "Post-Exposure Conditions and Determination of End-Point," by Raimon L. Beard, Conn. Agric. Expt. Station; "Exposure to Treated Food Medium," by A. W. A. Brown, Univ. of Western Ontario; "Screening Space Sprays Against Flies and Cockroaches," by R. H. Nelson, U. S. Department of Agriculture; "Soil Insecticides," by W. E. Fleming, U. S. Department of Agriculture; "Testing of Resistance of Chemically-Treated Textiles to Insect Damage," by M. M. Walton and H. H. Shepard, U. S. Department of Agriculture; "Screening Chemical Repellents," by P. Granett and E. B. Starnes, Rutgers University; "Insectproofing of Food Packaging Materials," by B. C. Dickinson and E. J. Incho, formerly U. S. Industrial Chemicals Co.; "Screening Chemical Attractants," by J. T. Medler, Univ. of Wisconsin; "Testing Acaricides," by Walter Ebeling, Univ. of California, Los Angeles; "Animal Sprays, Dusts, Dips, and Dressings," by R. C. Bushland, U. S. Depart-

ment of Agriculture; and "Techniques for Evaluating Systemic Insecticides Against Livestock Insects," by O. H. Graham, U. S. Department of Agriculture. Preceding an excellent general index to all the papers, there is also included in single alphabetical sequence a comprehensive list of all the literature cited in all the papers. This comprises a total of 553 titles, and is of interest entirely aside from its bibliographical value, since it enumerates by name most of the various individuals who in recent years have been working on and reporting results on the various problems discussed. Our good friend, the Editor, and his associates are to be congratulated upon the excellence and the practical usefulness of the results of their labors as thus far presented in these, the first two volumes, of this series.

J. S. WADE
U. S. Department of Agriculture

THE STONEFLIES (PLECOPTERA) OF THE PACIFIC NORTHWEST, by Stanley G. Jewett, Jr. Oregon State College Press, Corvallis, Oreg. 95 p. + iv. 1959. Paperbound. $2.00, from Co-op Book Store, Oregon State College.

The stoneflies are a rather well-worked group of insects in North America. Needham and Claassen, and Claassen alone, published comprehensive volumes on the North American adults and nymphs, as well as a catalog, all published over 20 years ago. These works made the Order readily accessible for regional studies. Following those basic contributions, other students of Plecoptera have published treatments of the stoneflies of Illinois, Minnesota, Washington State, Montana, and southwestern British Columbia. Simultaneously other papers were published giving new information about the nymphs and adults of stoneflies from all parts of North America.

In the present volume, the author brings together all the species now known from the Pacific Northwest—Washington State, Oregon, Idaho, and British Columbia. This is a manual designed to be used for the identification of the nymphs and adults of the stoneflies occurring in this area. As such, it contains very little new information, but represents a compilation from the previously published papers. Keys are furnished for the placing of specimens of adults and nymphs to suborder, family, genus, subgenus (if employed), and species. Following the keys, the species are listed alphabetically by genus, or by subgenus where subgenera are used. Brief literature citations are given for species and subgenera, but not for genera. Illustrations are furnished (but unfortunately not referred to in the keys) for many of the diagnostic characters used in distinguishing the adult males and females. The nymphs are not illustrated. Under each species a brief statement is given about its range. Some discussion is included for a few species. The volume covers 146 species.

This publication also gives a selected bibliography and an index. The author says that this work is designed "for use by the amateur as well as by those with more advanced entomological training, [but] it is assumed that anyone attempting to identify stoneflies to genera and species possesses some knowledge of insect anatomy and entomological terminology."

B. D. BURKS
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NEW PUBLICATIONS

A TAXONOMIC REVIEW OF THE BRITISH SPECIES OF CULICOIDES LATREILLE (DIPTERA, CERATOPOGONIDAE) by J. Allan Campbell and E. C. Pelham-Clinton Circa. 120 pp., with 291 text figures. *Price:* United Kingdom, approx. £1. 2. 0. Export, approx. U. S. $4.00. Postage included.

The Council of the Royal Society of Edinburgh has much pleasure in announcing that this work will be published in Section "B" of the *PROCEEDINGS OF THE ROYAL SOCIETY OF EDINBURGH* in the late Spring or early Summer of 1960. Copies may be obtained from the Royal Society at 22 George Street, Edinburgh 2, Scotland.

Entomologists who have already seen the work are eulogistic in their praise and it can safely be said that this paper is the first major contribution to the field in over quarter of a century.

BIBLIOGRAPHIC INTRODUCTION TO ANTARCTIC-SUBANTARCTIC ENTOMOLOGY by J. L. Gressitt and N. A. Weber.

The entomological fauna of Antarctica is extremely limited. Only 44 terrestrial species are known, representing Acarina, Collembola, Mallophaga, Anoplura and Diptera. Well over 700 species are known from Subantarctic islands, representing about 20 orders of terrestrial arthropods. Best represented are arachnids, springtails, lice, beetles, and flies, the last having the greatest number of species. Forms recorded from the Antarctic continent are listed, and numbers of species from Subantarctic islands are tabulated. Percentages of species which are wingless or short-winged are also tabulated. An annotated bibliography of 424 items is included. This paper was published in *Pacific Insects* (4): 441–480, December 1959.

THE BIOLOGICAL SCIENCES AND YOU. Anonymous. From Dean of Agriculture, University of Maine, Orono, Maine.

Brief and interesting discussion of careers in bacteriology, biochemistry, botany and entomology.

HOW TO HANDLE INSECTS FOR COLLECTIONS by Alvah Peterson. Contribution No. 6, Entomology Department, State Plant Board of Florida, Gainesville. 36 pages, 5 plates. 50 cents. 1959.

This short and general report was prepared primarily for the personnel associated with the State Plant Board of Florida. It would be of real interest and use to anyone associated with the subject matter.

FROM THE DESK OF THE MANAGING EDITOR

THE STYLE MANUAL.—At the recent meeting of the Conference of Biological Editors (CBE) held in Cleveland, Ohio, April 18–19, it was announced that the *Style Manual for Biological Journals* which has been in preparation for about three years would soon be ready to go to the printer. This *Manual* has been compiled by the Committee on Form and Style of the CBE and the American Institute of Biological Sciences (AIBS) and will be published by the AIBS.

The following is quoted from the preface of the final draft, earlier drafts of which have been read by approximately 100 editors and publishers:

"This style manual is designed for those preparing manuscripts for publication in biological journals and for students and other prospective authors. Style is interpreted broadly here to mean forms of expression in scholarly writing and the general technical requirements of journals, such as details for typing manuscripts, standard abbreviations, and citation of references.

"All fields cannot be covered completely, but it is thought that this manual will be accepted, at least in part, by most biological disciplines. The instructions and recommendations represent good usage and practice and, if followed, will establish high standards in the publications of organizations in the Conference of Biological Editors."

Before preparing an outline of the *Manual*, the Committee reviewed various style manuals and "sheets" giving instructions to authors, and concluded that existing man-

uals are either too long and difficult to use, or too short and lack substance. The Committee therefore prepared a manual of moderate size and coverage, with the hope that it might be practical and useful, especially to young biologists. It is not intended to be all inclusive but recommends good usage and accepted practices rather than a series of fixed regulations which all authors and editors must follow. It is recognized that if this *Manual* is to serve most usefully that it must be kept up-to-date by frequent revisions. Comments by users are therefore solicited.

At the Cleveland meeting nearly all of the editors present indicated their approval of this *Manual* and that its adoption would be recommended for use in connection with their respective journals. In the interests of standardization, the *Society Committee on Publications* (see p. 100 in this issue of the BULLETIN) has recommended adoption of this *Style Manual* for use in connection with the serial publications of the Entomological Society of America.

PUBLICATION COSTS.—Costs of publishing the journals of this Society continue to rise. Beginning with the June issue of the JOURNAL OF ECONOMIC ENTOMOLOGY a new contract at increased rates will become effective. In fairness to the George Banta Co., which prints the JOURNAL, no increase in prices had been requested since the change in format was adopted with Volume 48 in 1955—*except* for a 15% increase in the price of reprints in July 1957. Please note: this increase was not passed along to those we invoice for reprints.

Mention of publication costs is made here primarily to stress the need of the Society for more financial assistance on its publications. One important reason for the ever-increasing number of manuscripts received by the Society for publication is the availability of funds from grants for various research projects. A project is usually not considered completed until the results have been published. In many instances funds are specifically allotted to cover publication costs or they could be obtained if requested at the time application for the grant is made. In other instances grant funds could be used to defray at least part of the costs of publication if the grantee planned in advance to use a part of the funds for this purpose.

The Society is obligated to publish the results of research conducted by its members. But whenever possible authors should allot a part of the funds received from research grants for defraying partial cost of publication of manuscripts submitted to the Society for publication. Such financial aid would help the Society and it would also insure more prompt publication.

INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE

Notice of proposed use of Plenary Powers in certain cases (A. (n.s.) 44)

In accordance with a decision of the 13th International Congress of Zoology, 1948, public notice is hereby given of the possible use by the International Commission on Zoological Nomenclature of its plenary powers in connection with the following cases, full details of which will be found in *Bulletin of Zoological Nomenclature*, Vol. 17, Parts 6/8, to be published on April 8, 1960:

(1) Validation of the generic name *Delphax* Fabricius, 1798 (Class Insecta, Order Hemiptera) Z.N. (S)47;

(4) Designation of a type-species for the nominal genus *Macropsis* Lewis, 1834 (Class Insecta, Order Hemiptera). Z.N.(S)456;

(5) Suppression of the generic name *Promecopsis* Duméril, 1806 (Class Insecta, Order Hemiptera). Z.N. (S)483;

(8) Suppression of the specific name *longicorne* Latreille, 1804 (*Acrydium*) (Class Insecta, Order Orthoptera). Z.N.(S)675;

(9) Stabilization of the names of the North European species of the *Tipula oleracea* group (Class Insecta, Order Diptera). Z.N.(S)896;

(13) Validation of the familiar usage of the generic name *Tanytarsus* van der Wulp, 1874 (Class Insecta, Order Diptera). Z.N.(S)1245;

(14) Designation of a neotype for the nominal species *Dytiscus cinereus* Linnaeus, 1758 (Class Insecta, Order Coleoptera). Z.N.(S)1389;

(15) Validation of the generic name *Acilius* Leach, 1817 (Class Insecta, Order Coleoptera). Z.N.(S)1391;

(16) Validation of the specific name *dardanus* Brown, 1776 (*Papilio*) (Class Insecta, Order Lepidoptera). Z.N.(S)1403.

Any zoologist who wishes to comment on any of the above cases should do so in writing, and in duplicate, as soon as possible, and in any case before October 8, 1960. Each comment should bear the reference number of the case in question. Comments received early enough will be published in the *Bulletin of Zoological Nomenclature*. Those received too late for publication will, if received before October 8, 1960, be brought to the attention of the Commission at the time of commencement of voting.

All communications on the above subject should be addressed as follows: The Secretary, International Commission on Zoological Nomenclature, c/o British Museum (Natural History), Cromwell Road, London, S.W. 7., England.

W. E. CHINA, *Assistant Secretary*
International Commission on Zoological Nomenclature
March, 1960

MEMBERSHIP DECALCOMANIA

Illustrated above is a membership decalcomania. These are about 3 inches in diameter and are printed in green on a white background. These are suitable for affixing to your automobile windshield (in areas where this is legal) or to similar surfaces. The College Park office will send you one for 25 cents or 5 for $1.00.

Information Concerning
PAPER FOR PRESENTATION

1960 MEETING of THE ENTOMOLOGICAL SOCIETY OF AMERICA

Chalfonte-Haddon Hall Hotels, Atlantic City, N. J.

NOVEMBER 28–DECEMBER 1, 1960

Please note "Instructions for Submitting Titles and Delivering Papers" on page 50.

This form must be received on or before the August 15, 1960 deadline by the Program Chairman—

RALPH W. SHERMAN
USDA, Agricultural Research Service
Plant Quarantine Division
Washington 25, D. C.

Title: (*Brief, please.*)

Author's Name:

Institution and address: (*Please use appropriate abbreviations.*)

Time required for presentation: minutes. (10 min. maximum)

Projection equipment required: 2 x 2☐, 3¼ x 4☐, 16 mm Movie☐, None☐

Section or Sub-section preferred:

A	General Entomology	——	*Cd*	Ecology and Bionomics	——
Ab	Teaching	——	*D*	Medical & Veterinary Ent.	——
B	Physiology & Toxicology	——	*E*	Control, Extension and Regulatory Entomology	——
C	Insect Biology	——			
Ca	Biological Control	——	*Ea*	Extension	——
Cb	Apiculture	——	*Eb*	Plant Pest Control & Quarantine	——
Cc	Relations of Insects to Plant Diseases	——	*F*	Chemical Control	——

Synopsis:

Authors' names and synopses will be printed separately from the tabular time schedule of papers in the program and will appear in the form shown on the reverse side of this page. **See over.**

In the following box, *type or clearly print*, in the manner described and suitable for submission to the printer, your name or names and a synopsis (not to exceed 50 words) of your methods and results. Double check the correct spelling of common and scientific names in "Common Names of Insects Approved by the Entomological Society of America," appearing in ESA BULLETIN, Vol. 1, No. 4, December 1955.

This space for use by Program Committee.

SECTION	DATE	DAY	TIME	PAPER NO.	RECEIVED	MISC.

EXAMPLE

Authors' Names and Synopsis

278. C. T. Rivera and A. L. Steinhauer. *D. melanogaster* larvae were reared on a chemically defined medium. The molecular nitrogen content was adjusted to five levels, and the adult flies reared from these different media were tested for DDT susceptibility by a contact method. The results indicate decreased susceptibility to DDT with increased nitrogen in the diet.

ENTOMOLOGICAL SOCIETY OF AMERICA MEMBERS
PLEASE NOTE

1. **Dates for the Atlantic City meeting. November 28–December 1, 1960.**
2. **Program Highlights in the front of this issue of the BULLETIN.**
3. **Information on the Photo Salon and on Exhibits at the end of the Program Highlights.**
4. **Submit your title and synopsis (see over) before August 15, 1960.**